MODERN December, 1939 Machine Shop

MORE PRECISION WORK

RIVETT offers Series 918
HAND SCREW MACHINE

for true precision manufacturing of small duplicate parts. Bar stock may be held in push-out collet or parts for second operations may be chucked in draw in collet, step chuck or jaw chuck.

FEATURES

Swing 9 in., Collet Capacity 1 in.

Long Taper Key-Drive Nose

> Ball Bearing Spindle

Rotary Chuck Closer

Roller Bearing Turret

All-Electric Drive

Any Spindle Speed 100-3750 R.P.M.

To Spindle High Speed or to Stop —One Second Write for Bulletin 918

RIVETT

LATHE GRINDER INC.

POSITIVE ACTION

MASTER CONTROL VALVE



Large area insures positive movement of valve piston.

Composition moulded cup packings, Self Adjusted by air. -

Built in strainer furnished with valve. Easily removed for

cleaning.

Removable end covers permit servicing valve without breaking pipe connections.

> Bronze liner and body. Corrosion resistant materials throughout.

Furnished in 1/4" to 11/4" pipe sizes inclusive. Operating pressure 30 to 150 lbs.

Model 6245 Master Control Valve, illustrated, is used in conjunction with Bleeder Valves for Remote Air Operating Systems. Write for Bulletin 371 giving complete information.

"LOGAN"

6245 AIR CONTROL

LOGANSPORT

MACHINE.

INCORPORATED

LOGANSPORT, INDIANA

901 Payson Road. Manufacturers of Air and Hydraulic Devices, Chucks, Cylinders, Valves, Presses and Accessories

BENCH LATHES WITH TOOL ROOM TRAITS

Timken Bearing Equipped bench lathes are now found on production lines, in home work shops, in research and testing laboratories, and on various specialized jobs more or less closely connected with product manufacture.

With rigid spindles, free from chatter and amply guarded against radial-thrust loads, such lathes are capable of doing precision work at consistently low cost. If you want the best in bench lathes buy "Timken

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN

Rivett Bench Lathe
—spindle mounted on TIMKEN Bearings.

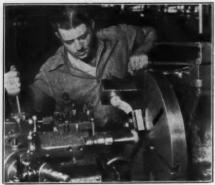
FOR THE ULTIMATE IN MODERNIZATION

LANDI your THREADS

LANDMATIC Hardened and Ground Heads

Excell in Aircraft Threading

Successful airplane manufacturers are just as careful in machining methods as they are in the selection of materials or the assembly of finish parts.



A west coast aircraft manufacturer uses the Hardened and Ground LANDMATIC Head for threading tail wheel knuckles made from forged 4130 steel.

By a previous method, two passes were used to finish the 9/16" diameter, 18 pitch thread, owing to the necessity of obtaining an absolutely straight thread. The LANDMATIC Head cuts the thread to a class 3 fit in one pass.

For The Ultimate in Thread Accuracy LANDISize your THREADS

Write for Bulletin No. F-80 covering LANDIS Hardened and Ground Heads

LANDIS MACHINE CO., Inc.



MODERN TOOL WORKS

ROCHESTER

NEW YORK



WHAT WILL BE YOUR ANSWER?

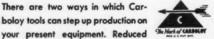
cutting time per piece, through higher

means of obtaining an immediate production increase on many of your jobs. There are two ways in which Carboloy tools can step up production on

If your plant has this problem to meet-

and your production involves machining

work—Carboloy tools may provide a



speeds, is one way. More continuous production per hour-through longer tool life - is the other way. Either, or both, may be the answer in your particular case.

> Carboloy representatives will be glad to help you get this extra capacity out of your present machines.

V Cut Steel with Carboloy. Send for Instruction Bulletin GT-120

CARBOLOY COMPANY, INC., DETROIT, MICHIGAN

CHICAGO . CLEVELAND . NEWARK . PITTSBURGH . PHILADELPHIA . WORCESTER, MASS.

Conadian Distributor: Canadian General Electric Co., Ltd., Toronto, Canada

CARBOLOY CEMENTED CARBIDE TOOLS

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Machine Shop

HOWARD CAMPBELL, Editor

Vol	ume	12

DECEMBER, 1939

Number 7

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TODAY'S PRODUCTION SAVE WITH A NEW CINCINNATI

MODERN MACHINE SHOP

December, 1939

New CINCINNATI 0-8 Plain Automatic Miller for Fast Production of Small Parts in Large Quantities

Cut your costs! Increase your production on the very small parts with the new CINCINNATI O-8 Plain Automatic Milling Machine. The photograph shows the O-8 climb milling the clearance cut on pivot shafts for subtracting machines at a 50% production increase over an older type machine, formerly used by the manufacturer.

With Hydraulic Rise and Fall Mechanism for Spindle Carrier,

you get automatic synchronization of table traverse movements with the vertical movements of the spindle carrier and cutter. Many other features make the O-8 Plain Automatic Miller the answer to to-day's need for fast production of small parts.



Write today for Catalog No. M-828

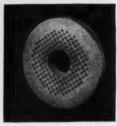
THE CINCINNATI MILLING MACHINE CO.



A versatile 12" Disc Grinder for small work!



0



THE No. 77A - 12" Gardner Double Grinder shown here, is built particularly for the dozens of small parallel-surface parts which can't be properly handled on larger, clumsier tools. It provides a nicety of adjustment, coupled with sturdy construction, which makes it capable of producing extremely close accuracies for a machine of this size.

It can be equipped with handoperated fixtures, or with rotary-type work carriers for high production.

The illustration shows outside cutter blades for a well-known electric shaver, being ground on the bottom face, two at a time, in a double hand cam-clamping fixture, which is mounted on a Hand-operated Swinging Arm. PRODUCTION: 10 per minute removing .010" stock, and holding the bottom face within .001" of parallel with the previously-ground top surface.

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EVERYWHERE, today, Gardner WIRE-LOKT Abrasive Wheels (seen at left) in 1", 2" and 3" thicknesses, are used as truly MODERN Disc Grinding members!

Your files should contain data on this handy, 12" Grinder— WRITE FOR DETAILS!

GARDNER MACHINE COMPANY

428 East Gardner Street Beloit, Wisconsin, U. S. A.

PLATE PLANER DOUBLES OUTPUT



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OUTPUT of this plate planer was practically doubled, simply by lubricating the lead-screw with Texaco Crater Compound No. 0,



GENERAL VIEW of Steel Tank & Pipe plant at Portland, Oregon, This plant is Texaco lubricated throughout.

Texaco Dealers invite you to tune in The Texaco Star Theatre—a full hour of all-star entertainment—Every Wednesday Night—Columbia Network—9:00 E.S.T., 8:00 C.S.T., 7:00 M.S.T., 6:00 P.S.T.

EXPERIMENTING to find ways for increasing the output of its large plate planer, The Steel Tank & Pipe Co., Portland, Oregon, hit upon this happy solution.

By changing the lubrication of the lead-screw to Texaco Crater Compound they were enabled to take heavier cuts and increase the speed, thus practically doubling output.

Texaco Crater Compound provides a viscous, tenacious lubricating film that doesn't squeeze out of place, but adheres to metal surfaces, protecting against friction and corrosion.

Experienced Lubrication Engineers, trained in the selection and application of Texaco Crater Compound, will be glad to demonstrate that savings can be made with Texaco Perfected Lubrication.

For prompt engineering service and deliveries, phone the nearest of our 2279 warehouses in the U. S., or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.



TEXACO CRATER COMPOUND

December, 1939

MODERN MACHINE SHOP

Q



Mill vertically, horizontally, or at any angle, without attachments...reduce set-ups...save time and errors involved in extra set-ups...put a No. 12 Van Norman Universal Miller in your toolroom, pattern shop or experimental department, and watch your costs drop and output increase. Write today, and get your descriptive bulletin.

SPECIFICATIONS

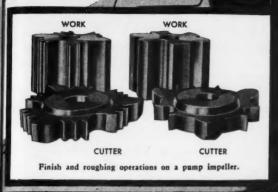
Table size: $37'' \times 8\frac{1}{8}$ Feed Range: $17'' \times 6\frac{5}{8}'' \times 17''$ Ram Movement $12\frac{3}{4}''$

VAN NORMAN

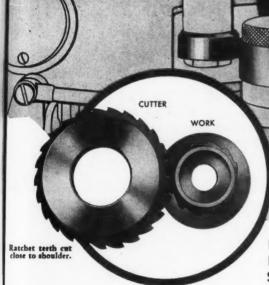
VAN NORMAN MACHINE TOOL CO., SPRINGFIELD, MASS.

10

Ratchet



A Method for more than just GEARS



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39

Cylindrical profile interrupted by projecting lug.

High precision manufacture of irregular profiles costs less via the Gear Shaper Method. Absolute control over profile accuracy and indefinitely

repeated duplication is inherent in the use of Fellows machines and Fellows cutters We shall be glad of opportunity to look over your blue prints and advise you on specific methods of handling your work. No obligation, of course. Address either office.

THE FELLOWS GEAR SHAPER

Springfield, Vermont or 814 Fisher Building, Detroit, Michigan



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MPLE

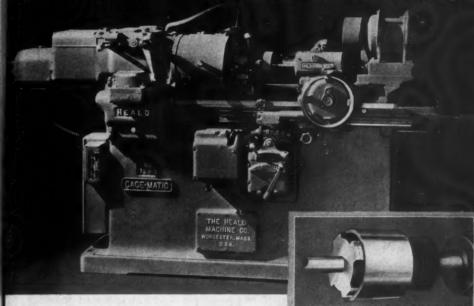
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Cutomatic INTERNAL GRINDING

- ... Reduces Costs of Manufacturing



MPLETELY AUTOMATIC GRINDING CYCLE HEALD GAGE-MATIC and SIZE-MATIC INTERNALS

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us. Ky.

> GHER production and more uniform accuracy can be obtained lower cost by putting internal grinding operations on Heald ge-Matic and Size-Matic Grinders. These internals are comtely automatic except for loading and starting the machine. tomatic features include automatic grinding to semi-finish size, tomatic wheel truing, and automatic grinding to finish size. As result, Heald automatics eliminate slow hand or visual gaging make possible uniform accuracy with minimum scrap and reduce erator fatigue. Heald Gage-Matic and Size-Matic Internals can furnished in both No. 72 and No. 81 types to suit your work.

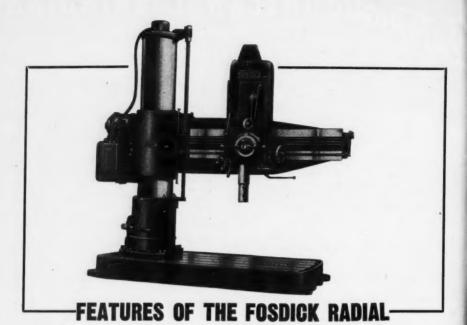
The HEALD MACHINE CO. WORCESTER, MASS., U. S. A.

GAGE-MATIC Internals control finish size by a solid plug gage illustrated above which automatically tests hole size at every stroke.

SIZE-MATICS control hole size by electrical contacts shown below which are actuated by came on the wheelhead cross slide.



rind on a HEALD for EXTRA Precision, Production, Profit



HEAD:

14

Hydraulic variable rapid traverse. Rapid power traverse hand-wheel does not revolve. Thirty-six spindle speeds. Eighteen feeds. Anti-friction bearings throughout. Splined shafts. Tap feed lever interlocked with high speed of spindle. All gear 50 carbon, high manganese, chrome, molybdenum alloy steel. Automatic throw-out on both ends of spindle travel. Adjustable spring counterbalance. Spindle safety. Safety to prevent spring being All controls wound too tight. mounted on the head. All multiple disc clutches adjustable from outside. Plunger provided to make it possible to feed beyond depth setting without disturbing the original setting.

ARM:

Hydraulic arm clamp interlocked with single lever control for unclamping and raising and lowering the arm. Hydraulic safety nut. Double I-beam reinforcement. Dovetailed ways.

INNER AND OUTER COLUMNS:

Hydraulic column clamp. Roller bearing adjustment to outer column. Inner column made of nickel molybdenum semi-steel casting.

Catalog M.S.R. gives complete details.

Write for it today.

THE FOSDICK MACHINE TOOL COMPANY

CINCINNATI . OHIO

MODERN MACHINE SHOP

December, 1939

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with the aid of the GISHOLT CROSS-FEEDING TURRET

● This manufacturer not only cut his cost %, but obtained greater accuracy by using the Gisholt 2L th Production Turret Lathe with cross-feeding turret to make se wheel hubs.

With the Gisholt cross-feeding turret, facing cuts are made by rely feeding the turret across the face of the work. In many es two operations are done at the same time, as, for example, ing with the cross-feeding turret while turning with the cross le or square turret. Furthermore, by setting the turret off ter to obtain the correct diameter, boring cuts are taken h single point tools, and on several dimensions tolerances held to within a half-thousandth.

here are many ways these new Gisholts can cut your machincosts. A Gisholt engineer will be glad to point them out you. Ask him to call.

OUR SMARTEST INVESTMENT TODAY—BETTER MACHINE TOOLS"



WHEEL HUB HOUSINGS FOR ROLLER BEARINGS

★ Machining these parts in half the former time was made possible with the Gisbolt cross-feeding bexagon turret, Gisbolt's accurate bardened steel ways, and Gisbolt standard tools.

Literature on the latest types of Gisholt machines will be sent upon request.



GISHOLT MACHINE COMPANY

1219 EAST WASHINGTON AVENUE, MADISON, WISCONSIN, U. S. A.

TURRET LATHES . AUTOMATIC LATHES . TOOL GRINDERS . BALANCING MACHINES



Behold my genial grin!

I have had it ever since I saw the amazing power of Thor's new lowpriced electric drill!"



" "SHOW ME", I SAID. And he did! 2 "'SHEW ME', I SAID. A.—
He put a new Thor '%" Drill Champion on a sheet-metal bolt-hole job and it went through that stuff like a hot knife through butter . . . a clean hole and no stalling!"



"'AT 35 BUCKS IT'S A BUY!', says I . . . and ordered one for the shop. I like it because it does the work fast; the boys like it because it's so easy to handle . . . and the P. A. likes it because it costs so little!"



4 "BUT THAT'S NOT THE MALF OF IT! Since we got this Thor Drill Champion we're fighting to keep it in the shop. Either the maintenance man is using it all over the plant or the installation crew has sneaked it out on us. Looks like I'll have to get a couple more to keep peace in the family."

1 "I WAS PRETTY SCEPTICAL when this job-ber's salesman told me he had a new ½" elec-tric drill for \$35.00 that had plenty of power even

for light production drilling.

IT'S TRUE that everybody who sees the Thor Drill Champion likes it. That's understandable, because this new tool has exactly what you want in a light-duty tool - Economy and Performance at one low cost. Try the Thor Drill Champion for your general maintenance, installation or light production work and you'll see why there isn't a low-priced tool in the running with it today. Write for further information or a 10-Day Free Trial now.

INDEPENDENT PHEUMATIC TOOL CO.

CHICAGO, ILLINOIS MEW YORK . LOS ANSELES

Thereffers more! PORTABLE ELECTRIC TOOLS



939



JARVIS

Flexible Shaft Machines and Tools



A Jarvis Multi-Biax Unit shown in operation for burring, polishing and sanding a "Wright" crankshaft.

Their quick speed changing device, universal swivel, precision collet hand piece and their light but strong design make these machines the choice of metal craftsmen everywhere. They are the flexible shaft machine for your finishing operations, such as rotary filing, grinding, polishing, buffing, sanding, etc.

Available in a wide variety of speeds and horsepower ratings in either floor, bench or overhead suspended types.

A great number of tools are illustrated in catalog MST and we would like to specially mention Jarvis manufactured Precision Ground from the Solid Rotary Files.

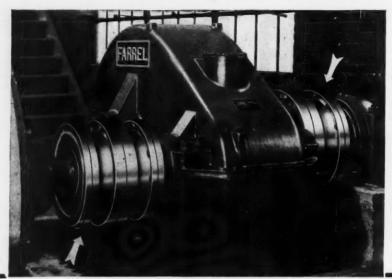
Write for Catalog MST

CHAS. L. JARVIS CO.

December, 1939

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MODERN MACHINE SHOP



Type DE Safety Flange Couplings on Steel Mill Drive

FARREL GEARFLEX' COUPLINGS are Easy to Install... Easy to Align... Easy to Maintain



Sectional View of Type DE Gearflex Coupling

Send for new catalog No. 443 giving complete descriptive and engineering data on all types of Farrel Flexible Couplings. The simplicity of Farrel Gearflex* Couplings adds to their outstanding mechanical merit. Simple to install; easy to align, with straight edge and feeler. They are disconnected with ordinary tools and without endwise movement of either shaft. They require no maintenance, only periodic lubrication with a standard grade of oil available everywhere. Gearflex Couplings meet any criterion for a flexible coupling in function and application.

*Trade Mark Reg. U. S. Patent Office



FARREL-BIRMINGHAM COMPANY, Inc.

The Gear with a Backbone



Perhaps your internal and surface grinding machines are ten — twelve — fifteeen years old and are no longer giving you satisfactory performance. If you can't afford to replace them, here's what you can do to increase production, hold closer limits and get better finish.

Grinder performance depends on the accuracy of grinding wheel spindle bearings, which must have minimum end and radial play, must not generate excessive heat, and must stand the gaff for months without adjustment and replacement.

The accuracy of Ex-Cell-O Precision Ball Bearing equipped Spindles produces a superior finish grind that cuts rejections to a minimum and in some cases eliminates subsequent lapping or polishing operations. Decreased vibration prolongs

wheel life, and often makes possible the use of a softer wheel.

Belt driven and inbuilt motor driven Spindles for your grinding machines are listed and priced in Ex-Cell-O's catalog. Write for a copy today. Order Ex-Cell-O Spindles for replacement on your old machines,—and save money.



EX-CELL-O	CORPORAT	ON . 1206	OAKMAN	BOULEVAL	RD . DETROIT, MICHIGAN
Please send, withou	t obligation, your late	est catalog on grin	ding spindles.		
Name		Tinl			. Company
Street		City			. State

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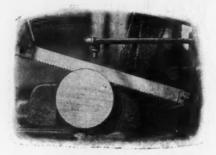
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1939



CLAIMS NOT WANTED HERE

Where metal meets metal, it's steel—not claims—that does the cutting. And, when the office is crying for production, shop men appreciate the real ability of VICTOR Hack Saw Blades to cut metal faster and to last longer—ability that has been demonstrated in thousands of American shops under actual daily working conditions. It's easy to prove to management that, dollar for dollar, VICTOR Blades cut more metal.

VICTOR HACK SAW BLADES

HAND* AND POWER, TUNGSTEN AND "MOLY"
*PACKED IN MODERN METAL BOXES



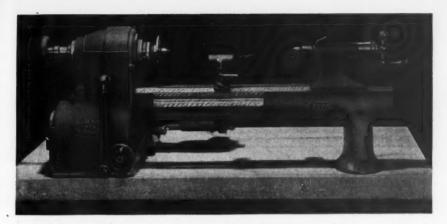
VICTOR SAW WORKS, INC.

Middletown, N. Y.

FOR THE FIRST TIME, VICTOR now offers four different types of hack saw frames, all especially suited to VICTOR Blades. Look for a chance to try them. You'll like them.



9413



DON'T BUY UNTIL YOU HAVE SEEN THE

NEW-- "Stark",

Integral Drive Precision Bench Lathe

PATENTED

ITS BUILT-IN DRIVE LEADS ALL COMPETITORS

The first tool of its class with builtin motor and speed changing mechanism, entirely eliminating mill wrighting.

Nothing under the bench . . . nothing overhead. Special bench or even bolting to bench, unnecessary.

The ½ h.p. geared ball bearing motor drives through a disc clutch and vertical V belt sheaves, and through V belts to the headstock, giving any speed at the turn of a wheel (located in front of lathe) from 156 to 2200 r.p.m. in Standard Model, and 260 to 3500 r.p.m. in High Speed Model. Speeds registered on a neat indicator.

Simply moving control lever to right engages the clutch, vertical position

releases, moving to the left instantly brakes the moving spindle.

Time-tried Stark double taper bearings in Standard Model. Best precision preloaded anti-friction bearings in High Speed Model.

Both ¾ and 1 inch collet capacity furnished in either model . . . 9 inch swing . . . 40 inch length of bed . . . Weighs 310 pounds . . . Takes regular Stark Attachments, Collets and Chucks.

Stark accuracy and stamina are traditional . . . incorporated in this streamlined new lathe.

Priced at only slightly more, than other precision lathes with SEPARATE complicated drives.

STARK TOOL CO. WALTHAM, MASS, U.S.A.

ESTABLISHED 1862 . ORIGINATORS OF THE AMERICAN BENCH LATHE

B-C REAMERS



For Extreme Accuracy and Low Costs



PRODUCT

MILLING CUTTERS. HOBS, HOBBING MACHINES HOR SHARPENING MA-CHINES, REAMERS, REAMER SHARP

SPECIAL TOOLS

ENING MACHINES,

The Barber-Colman Jig Boring Reamer, illustrated, is establishing gear centers to ±0.001", and holding bore diameters to "tenths", in special printing press frames. These tools have won special favor because they enable operators of nine precision machines to save large amounts of time and energy, to increase production substantially, and to maintain extreme accuracy on a wide range of special production and laboratory work

See Barber-Colman Catalog K for details on Jig Boring There, also, you will find much valuable information and data about B-C Inserted Blade Reamers, shown at right, and related products. Consult Barber-Colman specialists freely about any reamer problems.

BARBER-COLMAN COMPANY

General Offices and Plant ROCKFORD, ILLINOIS, U.S.A.

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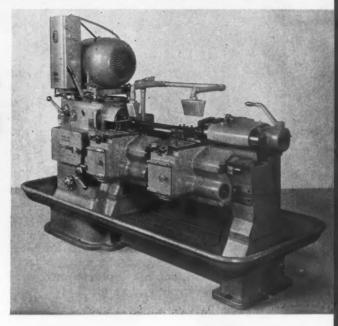
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MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE So-owing PEOPLE" SENECA FALLS, NEW YORK

MODEL LR Lo - swing UTILIZES TWO STANDARD CARRIAGES ON LONG AXLE JOB



Problem: To provide a standard automatic lathe for turning automotive axles approximately 32" long. Operations to include: turning diameter Back of Taper at the headstock end; and turning, squaring and chamfering the Spline End at the tailstock end of machine.

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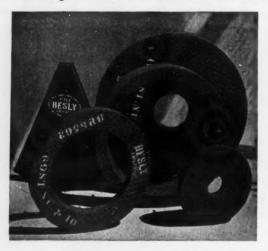
Solution: In order to avoid designing and building a special carriage of sufficient length for this job, the Model LR Lo-Swing lathe, equipped with two standard carriages was selected. Since these standard carriages are equipped with the Seneca

Falls Quick Change-Over Mechanism, the original set-up was simply a matter of setting two calibrated dials, thus eliminating entirely the necessity for designing any special cams or tooling.

The two standard Front Carriages perform rough turning operations at two points on the shaft. The Back Squaring Attachment squares and chamfers the tailstock end. The work is held between centers and driven with a Seneca Falls Automatic Work Driver.

LATHE NEWS from SENECA FALLS

Besly Titan Steelbac Abrasive Discs



The list of users of Besly Titan Steelbac Abrasive Discs reads like the roll call of the world's most progressive manufacturers. . Those who are truly wide awake realize the advantages of this Bolted-On Resinoid Bonded grinding member. • Safe-Economical-Free Cutting-Long Lived-Easy to Mount-Practically No Waste. In other words, the best thing of its kind ever developed. You don't have to accept our story without proof.

Try these Wheels on your Blanchard, Pratt & Whitney, Diamond, Osterholm, Bridgeport or any face grinding machine. Originally developed for the Disc Grinder but are now also widely used on these other machines. They really have merit.



Write for your copy of Booklet on Besly Titan Steelbacs.



LET US SEND YOU FURTHER PARTICULARS

CHARLES H. BESLY AND COMPANY

118-124 NORTH CLINTON ST.

CHICAGO, ILLINOIS



"NOW YOU'RE

Talking

MY LANGUAGE!"

THE smart lathe operator knows that he has a partner on a job—that he and his machine produce together as a unit. He knows that he's on a spot if his lathe cannot produce the quality and volume of work that he could turn out on a better machine.

But give him a new Monarch—and you'll see team work of the highest caliber—you'll agree that a good man and a good machine make an unbeatable combination.

Make this test today. Tell the man who is trying hard but falling down on the job that he will work on a Monarch lathe from now on. Watch his face light up in a smile of appreciation. Hear him say: "Boss, you're talking my language."

THE MONARCH MACHINE TOOL CO., Sidney, Ohio, U.S. A.



Chicago Sales Office: 622 West Washington Boulevard

Indianapolis Sales Office: 3115 North Meridian Street

Newark Sales Office: 1060 Broad Street

Pittsburgh Sales Office: 604 Chamber of Commerce Building

Agencies in principal industrial centers of this and foreign countries.

GENERAL ELECTRIC MAKES LAMPS FOR



PERHAPS I DO NEED MORE LIGHT BUT IT'S TOO EXPENSIVE!

That's what you think!
...G-E LAMPS COST
LESS AND BETTER
LIGHTING ACTUALLY
SAVES YOU MONEY



Here's why:

- G-E LAMPS GIVE MORE LIGHT FOR LESS MONEY because scientific research and development year after year are producing lamps which operate at constantly greater efficiencies, yet sell at continually lower prices.
- 2. G-E MAKES A COMPLETE LINE OF LAMPS . . . representing every type of electric lamp practical to industry. This fact assures you of an unbiased recommendation for lighting to fit every need.
- 3. SIXTY YEARS OF MANUFACTURING and application experience is back of every lamp General Electric makes. Many of these lamps must pass as many as 480 checks, tests, and inspections to assure satisfactory performance.
- 4. G-F's SYSTEM OF STRATEGICALLY located warehouses, supplemented by wholesalers' stocks, practically assures 24-hour delivery anywhere in the United States. This saves you time and storage space.
- 5. G-E's LIGHTING ENGINEERING SERVICE at Nela Park and in 17 key cities offers you its wealth of knowledge in solving lighting

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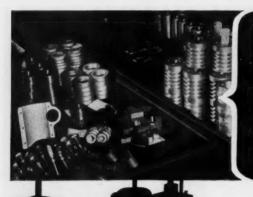


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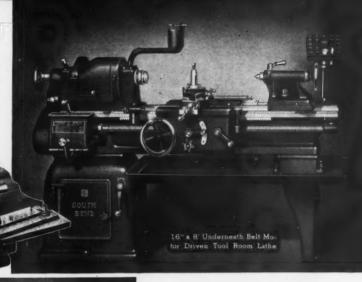
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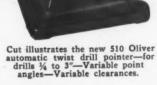
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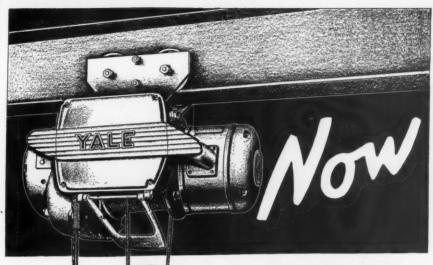
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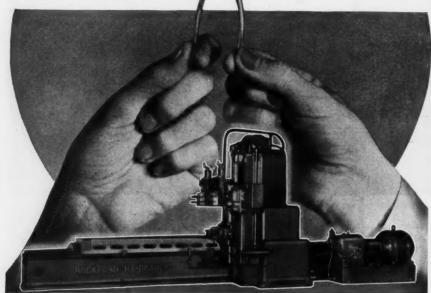
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Machine Shop

CINCINNATI, OHIO

DECEMBER, 1939

Vol. 12, No. 7



Production Operations on **La Cross Products

By WILLARD L. HULTS Superintendent, Schnefel Brothers Corporation

A FAMILIAR sight in practically any drug store is the display case presenting an assortment of the manicure scissors, nippers, nail files,

tweezers, and other hand beauty instruments marketed under the trade name "LaCross." These instruments are manufactured by Schnefel Brothers Corporation, Newark, N. J.—a firm that has

enjoyed a continuous growth, slowly but surely, through thirty-five years in the manufacture of manicuring implements.

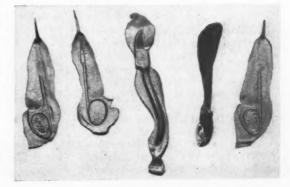


Fig. 1—Manicuring scissors and nipper handles are drop forged as shown here.

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Fig. 2—One of the several polishing departments where manicuring instruments are polished before plating.

Manicuring implements change but little in design from one year to another, consequently every step forward in the improvment of production methods is a definite gain; production plans are not disrupted by seasonal changes in design. In fact, changes are rarely made except when a better method is developed or when a better quality of steel is found available.

Manicuring scissors and nippers are drop forged from high quality steel. The illustration Fig. 1 shows some of the forgings as they come from the drop hammer, before being trimmed. An examination of this illustration will show that the scissors are made in two parts, each part comprising a blade and handle complete. After trimming, grinding, drilling, heat treating, polishing, plating, and buffing, two of these parts are assembled

together with a screw to form a pair of scissors.

The drilling operation is performed with an ordinary bench drill, the part being held in a simple jig. Scissors parts are heat treated in a salt bath which will be described later.

A section of the polishing department is shown in Fig. 2. Inasmuch as each individual scissors part must be polished by hand, due to the delicacy of the operation, more men are employed on the polishing operations than on any other one operation in the plant. Fine grade, high speed wheels are used and the air is kept clear of dust by an elaborate blower system.

The outer surface of the scissors handle is easily polished on a polishing wheel, but polishing the inside of the ring-shaped handle calls for spe-



Fig. 3—To polish the inside of a manicuring scissors handle, an abrasive belt is passed through the ring of the handle and onto a pulley which stretches it enough to provide traction.

hand and slips the end of the abrasive belt loop through the handles with his right hand. He then slips the belt onto the small pulley, which stretches it tight enough so that it is immediately driven by the driving pulley. Thus the abrasive belt runs at high speed in both directions through the workpieces and it only takes a few seconds to polish the inside of the rings to a bright finish. When finished, the oper-

ator simply slips the belt off the smaller pulley and out through the handles and he is immediately ready

cial technique in which an abrasive belt is used. A $\frac{1}{2}$ -in, fabric belt dressed with the usual abrasive and

glue is used, operating on the machine shown in Fig. 3. The driving wheel is the larger wheel at the left of the operator, the smaller pulley at the right simply serving to maintain the belt in position for use.

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To polish the inside of the scissors handle, the operator picks up several workpieces together with his left



Fig. 4—Each individual manicuring scissors blade is sharpened by hand by an expert workman.

December, 1939



Fig. 5—One of the assembly benches where the workmen are assembling LaCross manicuring scissors.

to slip the belt through another set of workpieces. The whole operation takes but a few seconds.

No machine has yet been developed by which these small, fine scissors can be ground automatically; the cutting edges of each pair of scissors are ground individually by hand as shown in Fig. 4. This is an operation which calls for a great deal of skill and which can only be acquired through many years of experience at this job.

The illustration Fig. 5 shows a line of assemblers at work assembling the manicure scissors. This operation is one that calls for a considerable amount of skill inasmuch as the blades must be adjusted so that the scissors will operate perfectly before they leave this bench.

Nail files are stamped out from strip steel of a fine quality, the files being produced at a high rate of speed in a stamping press. The most interesting operation in the production of nail files is that of cutting the teeth, which is done in the same manner and with the same type of equipment as is used for cutting the teeth of most other kinds of steel files. The operation is called "drifting," each tooth being raised by actually driving a sharp-edged chisel into the metal.

A drifting machine in operation is shown in Fig. 6. To form the teeth on a file, the operator lays the smooth workpiece in position on the table of the machine with the drifting tool at the end of the file farthest from him. It will be noted that the drift is set at an angle so that as the teeth are raised, the sharp edges project toward the front of the file. With the file in position, the operator pulls the lever which starts the machine and as the table feeds forward, or away from the operator, the ram carrying the drift reciprocates at a high rate of speed, each downward movement driving the drift into the surface of the file. The drift actually penetrates



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Fig. 6—The teeth are drifted into one side of a nail file in just a couple of seconds. The file shown in the machine is a 5½-in, file and has 76 teeth to the inch.

the file to a depth of approximately 0.005 in. Inasmuch as the feed of the table and the movement of the drift are synchronized, the teeth are evenly spaced on the file. The speed of the machine is such that the entire operation of drifting the teeth into a

file takes but two or three seconds.

In blanking out the files in the stamping operation, a crossshaped hole, a replica of the La Cross trade mark, is stamped in the handle of

each file. In the hardening operation the files are hung, by means of this hole, on hooks suspended from a carrier which makes it possible to hang a large number of files on one carrier.

To heat the files for hardening, they are suspended in the salt bath



Fig. 7—Nail files are hardened at a temperature of 1,500 deg. F. to give them the proper wearing qualities.

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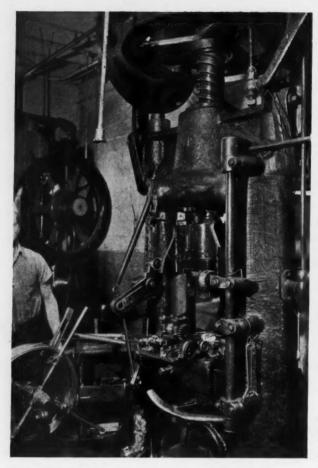


Fig. 8—Tweezer parts are formed in this Zeh & Hahnemann percussion press, to which a self-feeding mechanism has been applied.

furnace shown in Fig. 7, where they are heated to a temperature of 1,500 deg. F. This temperature is accurately maintained through the aid of the pyrometer which can be seen at the right in the illustration. When heated to the proper point, the files are removed from the salt bath and quenched in water, after which they are tempered to give them the amount of toughness and flexibility

calculated to impart the best wearing qualities.

The most interesting machine in the plant is the machine shown in Fig. 8, which is a Zeh & Hahnemann percussion press. This press is shown set up to form the parts from which tweezers are made. Inasmuch as the efficiency of a pair of tweezers depends largely upon their spring qualities, the tweezers are stamped from copperplated strip steel of special analysis, which is purchased in coils. To feed the steel to the machine. the coil is positioned on an S & S Machine Works reel. as shown in the illustration.

Once started, the machine operates continuously, feeding the stock automatically by means of a set of gearoperated rollers. Motion is imparted

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to the rollers by a ratchet which, in turn, is actuated by an arm carrying a cam roller so set that it is in the path of a cam attached to the side of the ram. Another cam, on the same side of the machine, actuates a mechanism which pulls a rod that projects through a hole in the machine frame, the rod being attached to the clutch in such manner that the machine is kept in continuous motion.



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Fig. 9 (Left)—Rear side of percussion press showing part of the automatic tripping mechanism. Fig. 10 (Above)—A tweezer is made by welding the two halves together in this Thomson spot welding machine.

The operating part of this mechanism is shown attached to the rear of the machine in Fig. 9.

To form a complete tweezer, two halves are spot welded together at the end in a Thomson spot welder, as shown in Fig. 10. Perfect alignment of the two parts is assured by the use of a small hand fixture into which the parts are locked before welding. The operation is simple and the weld is made practically instantaneously, providing a good weld at a high rate of speed.

When all processing and assembling operations on the scissors, nippers, tweezers, and other products have been completed, each individual product is carefully inspected and adjusted to perform the service for which

it was designed. The implements are then given an attractive finish by nlckel plating and buffing. However, while production is high, the parts are small and light, and large production can be obtained without the use of automatic machinery.

The fact is that it would be a difficult matter to make use of automatic equipment, not only on the plating but also on many of the production operations, due to the necessity for individual handling in order to obtain practical perfection. No machine could, for instance, adjust the cutting edges of a fine pair of manicure scissors with the same result that can be obtained by hand adjustment.

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MODERN MACHINE SHOP

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Hydraulic

By RENE W. P. LEONHARDT Berlin, Germany

TN the production of sheet metal products by the stamping and drawing process it is often found necessary or economical to revert to crank or eccentric presses for the finishing operation. In such a case the

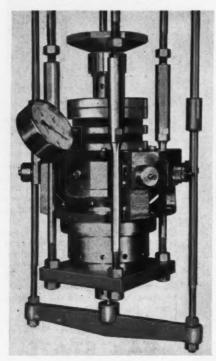


Fig. 1-Hydraulic Drawing Cushion of German Design

Drawing Cushion of German Design

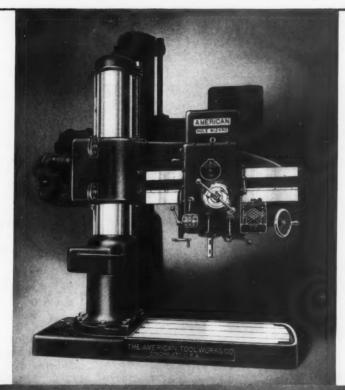
press has to be equipped with a special blank holder which must also be of simple and practical design.

In comparison with the conventional type of drawing press or mechanism designed to provide rigid blank holder pressure, the crank or eccentric press fitted with a special drawing cushion has a wider range of application and is cheaper as to initial cost. Moreover, the tools can be fitted quicker and the time required for the drawing process is reduced by 25 to 30 per cent.

However, the advantage of the pneumatic drawing mechanism is not always fully exploited, due to the constant specific surface pressure required and the initial outlay for compressor and tank as well as for operating expense.

The drawing cushion described here, which has a much wider range of application, has been developed to eliminate this disadvantage. Metal more than 1.5 mm (0.059 in.) thick can be drawn with the aid of this cushion and good work is assured by virtue of the uniform pressure exerted by the blank holder. An added economy consists in that the number of operations and tools required can be reduced by the use of the cushion.

While it is usual with double piston



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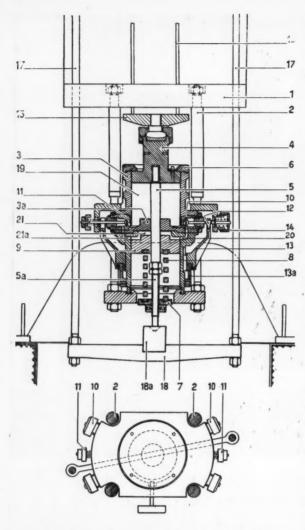


Fig. 2—Cross Section Drawing of German Hydraulic Drawing Cushion Showing Details. (1) Press Platen. (2) Holding Rods. (3) Cylinder. (4) Top Piston. (5) Piston Rod. (5a) Piston Rod End. (6) Cylinder Cover. (7) Spring Cover. (8) Piston Spring. (9) Bottom Piston. (10) Pressure Valve. (11) Suction Valve. (12) Adjusting Cones. (13) Bell-Shaped Holder for the Cones. (13a) Adjusting Cylinder for Holder. (14) Pressure Valve Springs. (15) Plate for Ejector Pins. (16) Ejector Pins. (17) Ejector Rods. (18) Traverse for Ejector Rods. (18a) Pan. (19) Liquid. (20) Pressure Valve Duct. (21) Space above Piston. (21a) Duct for Suction Valves.

apparatus to work at a pressure of six atmospheres* gauge (six atmospheres of pressure as read on the gauge) or 10 to 12 atmospheres gauge at the maximum. the mechanism under discussion permits of increasing the load to 40 kg. per sq. cent. (approx. 569 lb. per sq. in.) of piston surface. Consequently the overall dimensions of the drawing cushion can be kept at the minimum, which will facilitate the application of the cushion to press tables of limited dimensions.

The photograph Fig. 1 shows the unit, ready for application. The drawing Fig. 2 is a cross section of the unit with each part numbered for identification. After studying the drawing it will be easy to identify the parts in the photograph.

In setting up for a drawing operation, it will be necessary to adjust cones 12 and thus the tension of the valve springs 14 by altering the position of the housing 13. After the press has engaged, the ram and thus the rods 17 and traverse 18 advance downward slightly under no load. The

^{*} One atmosphere is 14.7 pounds.

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December, 1939

MODERN MACHINE SHOP

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top tool then rests on the work and thus also on the drawing ring, so that the rods 16 and the piston 4 move downward.

The downward movement of the piston applies pressure to the liquid in the space 19, with the valve closed. As soon as the pressure necessary for drawing is attained, the pressure valves 10 open to such an extent that when the tool penetrates deeper, the back pressure remains practically constant. The liquid now flows over into the space 21 and forces the piston 9 downward, the back pressure being held constant by the taut spring 8 until the completion of the drawing operation.

When the ram reverses, the pressure valve closes first. The ram, with the rods 17 and traverse 18, travel back the distance of the draw until the pan 18a strikes the piston rod 5a and the piston rod, piston 4 and the rods 16 move upward, at which point the drawn workpiece is ejected. Thus the workpiece is ejected at the finish of the reverse movement, and not at the start.

By applying the hydraulic drawing cushion and blank holder, single-acting crank presses can work as double-acting presses and where drawing cushions are already giving double-action efficiency, triple-action efficiency can be obtained. The blank holder pressure of the drawing cushion can either be increased, reduced, or entirely removed during the operation by the use of a specially-designed control.

Complete units can be formed by the use of the drawing cushion. In the case of a press which is wide between the columns, the drawing cushions can be formed into complete batteries and conveniently controlled by the operation of the ram. In this case, each cylinder of the press can be put under pressure independently of the others in order to equalize the blank holder pressures, as is often desired, at the circumference of the work.

The blank holder can also be held at the bottom stroke of the ram for any desired length of time after the termination of the drawing operation, before returning to top position. This will, in certain cases, prevent indentation of the drawn work.

When drawing U-section beams, it is not uncommon for the work to move upward on one side; in such instances the apparatus for securing the blank in the die is used. In addition, it is possible to use the entire apparatus merely as an ejector, or it can be rendered entirely non-active if desired when the pressure of the press is adjusted to zero, or when the piston is in its lowest position and the ejector is disengaged.

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Most sections contain tips on mounting and connecting the apparatus for convenience and safety; all sections are profusely illustrated with pictures, and are supplemented by circuit diagrams and tables to facilitate quick, accurate selection. Copies of Catalog 30-000 may be obtained from Department 7-N-20, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pennsylvania.

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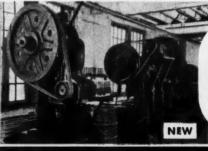
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Motors and Control

New Developments in Machining Steel with High Carbide Tools

By PHILIP M. MCKENNA

President, McKenna Metals Company

(This paper, presented by Mr. McKenna before the Cincinnati Chapter of the American Society for Metals, discusses the development, by McKenna Metals Company, of a carbide for the machining of steel.)

CTHE business of working metals without melting them is not Platinum was first worked by pressing together the platinum sponge, heating to a point somewhere below the melting point, and pounding into a solid mass, melting being impossible due to lack of furnaces or crucibles able to withstand the high temperatures necessary. Sponge iron was made into swords and other implements without complete melting, due both to inability to obtain high temperatures and lack of containers which would withstand such temperatures. Now we are back again to the production of metallic parts without melting, the process being known as 'powder metallurgy.'

"Hard metallic carbides of the type used in tools have characteristically high melting points, and it is to be expected that in forming carbide compositions that materials are not melted. Melting is a means of dislocating the atoms from their typical crystalline lattice arrangement and usually a substance with a high melting point also has 'high hardness,' or resistance to mechanical deformation.

"Tungsten carbide was known to be hard, and tools containing tungsten carbide were made fifteen years ago. High hardness was a characteristic, and the tools were suitable for some kinds of cutting. In fact, work tools were made from it in the period from 1919 to 1923, but the tools would not withstand heavy cuts without breaking. Then it was discovered that if a porous sponge were made of tungsten carbide and the pores were impregnated with iron, the sponge actually 'sopping up' the iron, a more durable tool material would result.

"This tool was not entirely successful, however, due to the fact that the resulting product was as weak as cast iron. The process was improved upon by adding from 5 to 15 per cent of ground cobalt to tungsten that had been carburized and heating the mixture, which had been pressed into shapes suitable for tool tips, to a temperature at which the cobalt would melt and react, sintering the composition together.

"Fortunately, tungsten carbide has high hardness and a high rate of thermal conductivity; thus both tungsten carbide and the hard compositions in which tungsten carbide is the principal element conduct heat about three times as fast as steel. The result is that, when taking a cut on non-conducting substances such as iı

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bakelite, the extreme cutting edge is cooled somewhat due to the fact that the heat is carried off by the tungsten carbide.

"Thus tungsten carbide is very suitable for the machining of materials which produce a crumbly chip, such as cast iron and brass, which have low tensile strength. Tungsten carbide was first regarded hopefully as a tool material with which all metals could be machined, but it was found that it would not cut steel satisfactorily. The difficulty lay in the fact that steel chips would weld onto the upper surface of the cutting point and carry away small portions of the tungsten carbide, causing a wearing known as 'cratering.'

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"Various remedies were proposed to overcome cratering. Tantalum carbide was added to destroy the affinity of the steel for the carbide, and it was found that these tantalum carbide compositions were better than the tungsten carbide in respect to 'galling.' Titanium carbide was also tried. being mixed with tungsten carbide for machining steel. About this time we adopted a measuring test of carbide tool compositions to afford a means of telling when a good tool combination was obtained. Two tests were used; the transverse rupture test, and the Rockwell hardness test.

"In order to obtain some idea as to when the correct combination of strength and hardness was reached, we decided to develop a formula to show the tool value. Cemented carbide tools can always be made as hard as anyone wants, but strength is apt to be lacking. Accordingly, we expressed the tool value as a fraction as follows:

Tool value =
$$\frac{10 \text{ x break strength in kilograms}}{5(93 - \text{Ra}) \quad \left\{47 - \frac{\text{RA}}{2}\right\} + 140}$$

"Having adopted this tool value

formula as a gauge, we tried numerous hard materials as ingredients and we discovered several new ones which, according to our formula, would result in tool materials of higher value. We found the best of these to be a new intermetallic compound, tungsten titanium carbide, corresponding to the formula WTiC₂. We felt that this substance was in itself



Fig. 1—A tungsten titanium carbide tool at work turning a 10-in. diameter nickel chrome molybdenum steel forging having irregular surface and heat treated to 46 scleroscope.

a discovery, having previously been unknown.

"Tool compositions made from the new tungsten titanium carbide compound had a tool value, according to our formula, of 129 to 130. When the tool metal produced from it as an ingredient had a Rockwell hardness of 91A, its transverse rupture test was also high, being about 240,000 pounds per square inch of 1920 kilograms on the test mentioned. Previous compositions made from carburized tungsten or carburized tantalum and cemented with cobalt or nickel had a value in the best of them of about 95 to 105. Thus we obtained a new combination of strength and hardness in

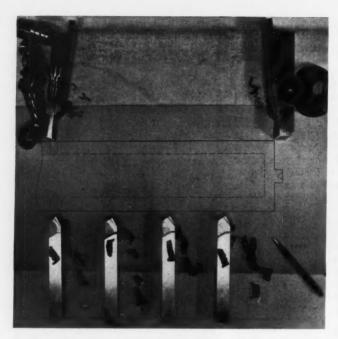


Fig. 2 — Tools arranged on drawing to show location of turning, facing, and cutting off tools used in machining of 5-in. diameter SAE 1045 steel shells.

speeds previously possible and were tough enough to take feeds as heavy as the machines could pull at the high speeds used. It was our observation that they made it possible to cut steels. economically, of a hardness hitherto considered unmachinable for practical purposes.

"The illustration Fig. 1 shows

a typical application of a tungsten titanium carbide tool, turning a 10-in. diameter nickel-chrome molybdenum steel forging having an irregular surface and heat treated to 46 scleroscope. The piece is being turned at a speed of 150 feet a minute, with a feed of 1/32 in. and a depth of cut varying from 7 to 34 in. A Kennametal tool, 16 in. thick and % in. wide by 11/4 in. long is used, set at 45 deg. side cutting edge angle. This tool is of the medium grade known as KM. A saving of 30 per cent floor time is made in machining these alloy steel bars which with high speed steel were machined only with difficulty at about 40 feet a minute.

"Another illustration of the use of the steel-cutting carbide tools is presented in Fig. 2, which is a schematic representation of the set-up used in machining 5-in. diameter shells of SAE 1045 steel, showing the tools

the amounts necessary for tool material by the use of the new product.

"The thermal conductivity of the new compositions made with various proportions of binder metals was surprisingly like that of steel. For the machining of steel, we found the new alloys had three desirable characteristics. First, they had high strength. Second, they had hardness as measured by the Rockwell test approximately equal to the tungsten carbide, and, third, they were 'non-cratering' when used to machine steel.

"The wide scope of usefulness of the alloys made from WTiC₂ was due to their combined strength and hardness. We introduced tools tipped with the new metal for turning, boring, and facing of rough steel forgings or scaly and sandy steel castings. The tools made possible large savings due to the fact that they could be operated at from two to six times the

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Fig. 3 — Milling cutter tipped with No. 2 Kennametal facing an SAE 3145 steel bar.

located in their approximate initial positions. The pieces on the rough are 5½ in. diameter and 17½ in. long and the operations included are turn, face, cut off, and chamfer. The machine is a Fay Automatic Lathe.

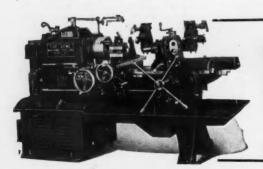
"The tools used are four turning tools with KM tips, mounted on the carriage, a back arm facing tool, and a cut-off tool. The turning tools are fed toward the tailstock and are ground accordingly. Specifications are as follows: Style 12 shank size, 1 x $1\frac{1}{2}$ x 8 in.; tip size, $\frac{9}{8}$ x $\frac{9}{8}$ x 1 in., grade KM; chip curler 10 deg. from side cutting edge angle, $\frac{3}{10}$ in. wide at end. Depth of cut, 1/32 in. Feed, 0.024 in. Tool angles: side clearance, 6 deg.; front clearance, 6 deg. Back rake, 0; side rake, 4 deg. Cutting edge angle on side, 30 deg.; on end,

30 deg. Nose radius, 3/64 in. These tools are fed in to the required depth of cut at an angle of 26 deg. and each turns 4% in. of longitudinal distance.

"The back arm facing tool has a special Style 15 shank, size 1¼ x 2 in., with a % x ¾ x 1¼ grade

KM tip. A chip curler is ground $\frac{1}{16}$ in. on the end. Depth of cut is 1/32 in. and the feed is 0.0105 in. Clearance angles are 3 deg. on side and 4 deg. on end. Rakes are 10 deg. back and no rake on side. Cutting edge angles, side, 1 deg.; end, 0 for $\frac{7}{8}$ in. 60 deg. chamfer. This tool did remarkably well as the ends of the shells were very rough and scaly with slag imbedded in them.

"The cut-off tool shank was $\frac{3}{4}$ x 2 x 8 in. and the blade section was $\frac{1}{2}$ x 2 x 2 in. long. Tip size, $\frac{3}{8}$ x $\frac{1}{2}$ x 1 in. Using a feed of 0.0055 in. per revolution, the tool was fed through the shell wall, which was about $\frac{3}{8}$ in. thick. The tool cut off 74 shells before needing regrinding. After 38 shells had been turned, the turning tools were adjusted in from 0.001 to



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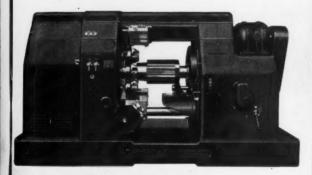
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0.002 in. After 86 shells had been turned without regrinding, the current shut off in the middle of turning a shell before facing and cut-off tools had come into operation. The result was that the four turning tools stopped in the cut without the feed being released. However, the shock did not crack or shatter the tips. About 1/32 in. was flaked off the top and the tools were reground and put to work again. A total of 115 shells were then turned without regrinding the cut-off or facing tools. Thus it seems a reasonable estimate that 100 shells may be turned per grind of tools. Time was 55 seconds per shell. Cutting speed on all tools was 310 ft. on the periphery.

"The milling of steels and other metals is feasible with the new hard carbide alloys. The illustration Fig. 3 shows a milling cutter, tipped with the new metal, in operation face milling tough alloy steels of analysis SAE 3145. Data on this job was as follows:

"Test bar 3145 steel, 204 Brinell, diameter 7 in. Depth of cut, $\frac{1}{16}$ in. Feed, $14\frac{1}{2}$ in. per minute. Speed of cutter, 148 r.p.m. Cut speed, 319 ft. per minute. Finish, commercial. Cutter, McCrosky 8 in. right hand. Blade, C. R. K. No. 2 Kennametal. Style, C. T. F. Horsepower consumed at beginning of run, 9.75. Horsepower consumed at end of run, 12.92. Machine, Cincinnati No. 5 High Power Miller.

"At the end of the test the cutter showed evidence of breaking down and the loading edge was slightly blued and pitted. From data on hand the ratio of horsepower input to cubic inch stock removal for the above metal is 0.7 cu. in. per h.p. on this high power machine. This shows that the cutter is fairly efficient, removing



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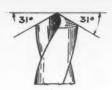
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Engineering Company Frankenmuth, Mich. $0.65\ \text{cu.}$ in. per h.p. at the beginning of the test and $0.493\ \text{cu.}$ in. per h.p. at the end.

"The test was continued for about 20 cuts and comprised a very severe test as the cutter blades struck the edges of the steel bar at a variety of angles as the cut proceeded across the bar. The milling of malleable and SAE 1045 steel with such tipped mills is much easier than milling the tough nickel steel tested. Long commercial runs at table feeds four to six times as fast as those customary with high speed steel cutters are being made with these tipped cutters.

"Thus it may be seen that the range of jobs that may be machined economically has been increased by the use of a tool made from WTiC, crystals. These new steel-cutting carbide tools are being employed in machining gear blanks of nickel alloy steel, turning automotive axles after heat treating, machining projectiles of SAE 1045 heat treated steel, roughing and accurately finishing stainless steel cylinders, turning cast steel truck wheels, machining oil well joints and pipe, making road-building equipment, turning motor shafts and silicon laminated motor cores, and in cutting special alloys such as Hadfield's manganese steels and hardenable Monel metal.

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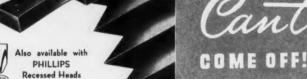
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The Cruise of the Dirigible Boiler

By PAUL BRUHL

IF you have never been in Patagonia you can hardly be expected to know about the "pampero," but if you ever go there you will suddenly notice it blowing—steadily—incessantly—day and night. And you'll find the air full of sand, your eyes full of tears, and your mouth full of grit whenever you take a bite of food.

That's just what I found when I arrived at Commodoro Rivadavia, and if I had had a return ticket or the pesos to buy one I would have taken the same ship back to where I came from. But the job I got with an oil company was good enough, the pay was not meagre, and the food was satisfactory even with mutton six days a week and lamb on Sunday. There was a bunch of good fellows in our camp, which helped. We worked twelve hours a day, slept in corrugated sheet metal barracks, and had our laundry done by two Chinese who were paid by the company.

My job was to drive a 15-ton 100 h.p. Holt tractor with an exhaust that I was sure could be heard simultaneously in three counties. I hauled pipe for the wells, oil for the boilers, machinery, wood and sheet iron for the buildings, food—in fact, everything that had to be moved in camp or field. And everything we used came from either Buenos Aires or the U. S. A. by cargo-boat, to be transported from the deep-water anchorage of the ship to the shore in scows

where it was loaded onto a trailer to be hauled by tractor to the camp.

One day Mr. Brush, the superintendent, said, "Paul, drive down to the coast and bring up a boiler that has just arrived from Buenos Aires. Take Tony along to help you—he's a good mechanic and can help you if you get into trouble. And be back in a day or so, so I won't have to worry."

"Mr. Brush," said I, "that boiler is as good as on your doorstep right now."

Mr. Brush smiled and said, "Good luck, boy, and count your tequillas (drinks)."

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A few minutes later we were on our way. Tony brought along an extra sheepskin to sit on and to act as a sort of a shock absorber, and he remembered to bring his mate and kettle and bombilla so that when we got too weary of the jolting and racket we could build a fire by the side of the road and have some hot mate. With a dash or two of tequilla in the mate to flavor it, if you know what I mean.

Our Holt ambled along at about 15 per, which was all it could make on a makeshift road through hills of sand and gravel separated by ditches, most of which were dry. Presently, however, Tony broke the monotony by pointing to some herds of sheep which, instead of grazing peacefully on the hillside, were nervously zigzagging about as though apprehen-

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CLEVELAND, OHIO

sive of some approaching danger.

Raising my voice above the roar of the exhaust, I shouted into Tony's ear, "Those sheep are excited, and when such peaceful animals as sheep get exicted, something is going to happen. But whatever it is, I hope it will bring an end to that blasted pampero."

"That's what it will be, Pablo," said Tony; "I have lived long enough among the Gauchos to know why sheep get excited. The wind is going to change. The pampero will cease and an east wind will come up that will bring rain—and the rain won't be a drizzle."

We had been two hours on the road and two to go - it was 40 miles to the coast - when we stopped for a little siesta. I gathered some dry wood so that we could make a fire to heat water for mate, but our rest didn't last long. The west wind died out and the sand in the air began to settle, but almost before we knew it a breeze was blowing from the opposite direction, bringing a fleet of dark clouds from the direction of the Increasing in intensity momentarily, the breeze became a wind, the wind turned into a gale, and the gale grew to a storm as we hurriedly gathered our utensils and packed them in the toolbox of the Holt. Hardly was this accomplished when the clouds opened and we became the target of a deluge. We huddled under the trailer, hoping to fend off some of the storm's fury, but it was of no use. In sheets the water came through the cracks in the trailer box and ran down our backs and legs and into our shoes to overflow and mingle with the hundreds of other rivulets that flooded the ground where we were squatting.

The downpour lasted about an hour, then died out and everything

was as before except for the bruised and broken countryside. It seemed that nothing had escaped the blast of wind and water. But we had no time to survey the wreckage; it was up to us to get under way and make up for lost time. When we finally arrived at the coast it was evening, and as we turned north on the coast road that led to our storage camp, which was several miles from the port and settlement of Commodoro Rivadavia. we passed a number of natives striving desperately to salvage their huts from the breakers into which they had been washed.

As we approached our storage camp we saw Juan, the watchman, running down the road to meet us, gesticulating wildly and pointing oceanward. It was evident that something had happened, and we weren't kept long in suspense. As soon as we got close enough we could hear his cries; "Tony—Pablo—la caldera—out there in the ocean."

We looked, and sure enough out there our boiler was floating up and down with the waves, looking like a chopped-off whale riding the breakers.

"What has happened, Juan?" we asked in unison.

"Everything. Tony, everything," Juan answered, waving his arms in despair. "The boiler was high and dry this morning where the cargoboat people unloaded it from their raft a few days ago. And it would be high and dry now if the pampero hadn't stopped. But then the seawind started and a storm came and just floated the boiler way. I couldn't hold it back and I'd like to see the muchacho who could in that gale with the rain pouring down and the waves rolling up and the water six feet deep where there was dry land a few minutes before, Senores, it



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was a catastrophe."

"Well, whatever it was," Tony interrupted, "We've got to get that boiler back and get it back quick."

"You bet your life we have, Tony," I said. "I've promised Mr. Brush to have this boiler at No. 3 well tomorrow."

So we considered the possibility of dragging one end of a cable out to the boiler by means of a boat, but soon decided that a cable long enough to reach to the boiler was out of the question. Besides, it would weigh a ton. Then Tony raised the question of a tugboat, but Juan declared that we had never seen one around there, so that settled that. We finally agreed that the only thing to do was to go over to Juan's shanty and cook some supper and wait until morning to start salvage operations on the boiler.

The next morning Tony was out scanning the sea for the truant boiler while the sun was yet emerg- . ing from the horizon, and presently we heard his call. "It's stranded. boys! Out there on a sandbank! Come out and look!" Sure enough, the boiler had come to rest, with its skids stuck in the sand, about a mile off shore. In no time we had dressed and were out on the water in a rowboat. The boiler rested upright on its skids, endwise to the ocean, and the tide was just low enough so that the water licked the ashpit door. If we could get the boiler free it would be no trick at all to tow it back to land, but getting it out of the sand presented a problem. Many possible solutions were considered, but none was found practical.

The day was beautiful; not a trace of a cloud was to be seen, and the pampero was apparently taking a rest. We could have been happy if it had not been for that blasted runaway boiler. Downheartedly, we fi-

nally rowed ashore again to dry our pants, socks, and shoes, and eat some of the *puchero* left over from the previous evening's meal. None of us spoke much. I began figuring out what I should tell the boss when I should have returned without the boiler, and Tony sauntered about still trying to think of something that would get us out of our predicament.

I had just about decided how to break the news to Mr. Brush when Tony came running into the shanty, fairly perspiring with enthusiasm as he shouted, "Senores, my name isn't Antonio Maximilian Guillermo Decosta y Sarayo if I haven't got the scheme to bring that boiler back alive. There—" and Tony pointed to a stack of logs, "is means No. 1, and here," he said as he led us into the warehouse, "see those pipes, nipples, elbows, and valves? That will be means No. 2 and means No. 3 will be a good-size heap of firewood!"

"We'll nail the logs to the skids to give the boiler buoyancy. The pipes with elbows and flanges we'll fasten to the dome, one pipe running down each side of the boiler into the water at a suitable angle with a valve on the lower end. The wood we'll use to get up steam. When our steam is up and the tide comes in we'll open the valves. The steam rushing out of the submerged pipes will propel that boiler like a rocket off the sandbank, and if the steam holds out we'll navigate right into port."

Juan and I were both amazed, but it sounded like an idea and so we didn't dillydally. We went to work at once, dragging the logs into the water, tying them together to make a raft, opening the box that had come with the boiler and which contained the trycocks and steam and water gauges. Tony and I assembled the pipes and valves.



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As soon as possible we ferried the paraphernalia out to the boiler and assembled the parts to the boiler under Tony's instructions. We even fastened the logs to the skids up to the underside of the shell and filled the boiler with sea-water, which had to be done through a hand-hole in the top. We didn't sing any songs that evening; we were too dog-goned tired.

And I was still tired at 3 A. M. when Tony got us up to row out and fire the boiler. Was that a job! The wood was damp, the ashpit was full of water, and although the boiler was practically on dry land with the tide out, there were enough puddles around to make the task of getting up steam a dismal affair. We had no stack, so the draft exhibited itself as a miserable breeze.

Tony saved the day by suggesting that we get gasoline and oil from ashore and soak the wood, which we did. After that things went nicely. At noon we had 90 pounds on the gauge. The tide was coming in, and the water rose to the height of the firedoor.

On an extension nailed to the rear end of the skids Tony stood like a master on the bridge of his vessel, with his hands on the valves. The pipes leading down from the dome on each side extended well beyond Tony's position into the water, thus ensuring that Tony would be safe from scalding by the escaping steam. The crucial moment had arrived.

Tony opened the valves a little, then more, then as far as they would go. Violently the steam rushed out of the three-inch pipes, churning the water into whirlpools. For seconds nothing happened, and through the roar of the steam I heard Juan mumble a prayer. Then it moved-slowly, like a water-logged dinosaur upon which Nature was trying a new method of propulsion-but it moved. Tony manipulated the valves to reduce the steamflow, because the gauge showed a definite drop in pressure and the fire in the box was rapidly losing out in the battle with the inrushing water. An instant more and the boiler was off the bank and floating. It sank a little as it floated free of the sand, but the logs kept it well afloat and the force of the escaping steam was still driving it away from the bank and in the direction of land.

The two pipes served their ingenious purpose well. By opening one valve more than the other, Tony steered the boiler to a course. Without mishap he docked his strange vessel on the sandy shore, we following with the boat. He said nothing as he stepped off his improvised bridge, but he must have felt as Admiral Dewey must have felt when he returned from the Battle of Manila.

Our tractor did the rest. With a cable we dragged the boiler onto dry land and loaded it onto the trailer. As we pulled into camp, the boss came to meet us, worried, angry, and ready to raise Cain, but when he heard our tale he promised the both of us a five-peso-a-week raise, and as sure as the pampero had started to blow again, we got it.

"Twin Engined for Progress" is the title of an attractive 16-page catalog which has been published by Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh, Pa. Contained in the catalog are illustrations from the exhibit "Steels of Today and Tomorrow" at the New York Museum of Science and Industry showing alloy steels at workland-sea-air.

Included also in this catalog is a twopage spread map showing the location of Allegheny Ludlum mills and branches. A complete list of products manufactured by this firm is given.

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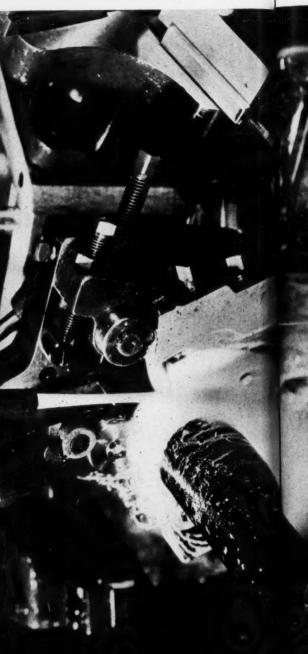
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FROM READERS

Lubricator for Press Stock

By F. J. WILHELM

ILLUSTRATED in the drawing is a stock lubricator of simple and inexpensive construction, designed for use in sheet metal stamping work. The lubricator consists essentially of

and another under the nut will increase the operating efficiency of the device.

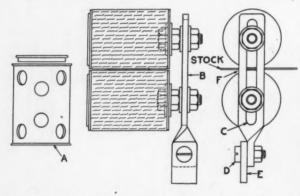
With the cans ready, the bolts are inserted through the slot C in the bracket B and anchored in position by threading nuts on, with washers on each bolt each side of the bracket.

Thus the nuts can be tightened to hold the cans in position without binding on the end walls of the cans. The screw **D** is used to attach the bracket to the bar **E**, which can be attached as required on the press or stock table.

To fill the cans with lubricant, the bracket **B** is swung to horizontal by loosening the screw **D**, thus bringing the cans into upright position. The tops can be removed, the cans

filled, and the cans swung back to operating position.

To position the cans for operation, the bracket is adjusted so that the stock will easily pass over the lower can as it is fed to the press. Then the upper can is lowered until it rests on the stock and the bolt is tightened, with the stock passing between the cans as indicated at **F**. As the stock feeds through between the cans it causes the cans to rotate, thereby



Drawing illustrating design of simple, home-made lubricator for press work.

two friction-top tin cans of the type shown at A. A number of holes are drilled in the side of each can and the can is then covered with a layer of felt, as shown.

Through the bottom of each can a hole is drilled so that a bolt can be slipped through the hole from the inside and locked in position by a nut on the outside, just enough play being left so that the can can revolve on the bolt. A washer under the head

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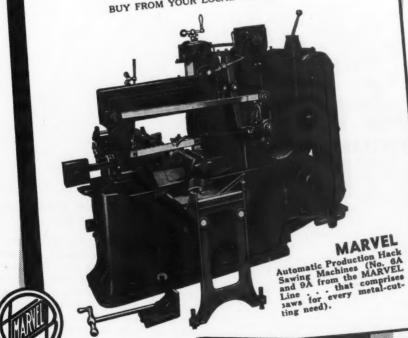
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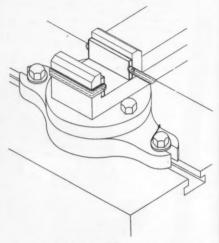


aiding the felt coverings to become soaked with lubricant as the lubricant runs out through the holes in the cans. The result is that the stock receives a coating of lubricant as it passes through on its way to the press.

Vise-Parallel Retainers

By CHAS. H. WILLEY

WHEN using parallels in connection with a milling or drilling vise, the parallels can be kept from slipping or falling over by the use of



Drawing illustrating "kink" for holding vise parallels in place.

the "kink" illustrated in the drawing. A small hole is drilled in each end of each parallel and pins are driven into the holes. Strips of rubber inner tube are cut to suitable size, holes are cut for the pins, and the rubber strips are stretched around the vise jaws until the holes can be slipped over the pins. The strips hold the parallels in place, thus preventing them from being dislocated and keeping dirt and



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ne in ek it chips from collecting under or behind them when clamping work in the vise.

Isolating Machine Vibrations

By W. F. SCHAPHORST

WHILE the development of fine balancing equipment in recent years has made possible the building of mechanical units from which all vibra-

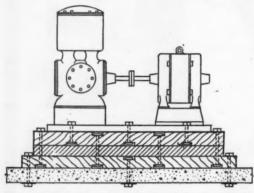


Fig. 1—Drawing illustrating use of cork insulation under machine, on top of foundation.

tion is eliminated, in the majority of cases such fine construction is not economical. Thus machines continue to vibrate in operation, necessitating, in many instances, the employment of devices which will confine the vibrations to as small an area as possible. The three drawings presented here illustrate methods that have successfully been used to prevent the vibrations of operating machinery to be transmitted to the floors and equipment in the immediate vicinity.

One of the most effective methods, as shown, is to isolate the vibrating machines from the building or the ground by means of a strong resilient material which will have the effect of

> "damping" the vibrations. Natural cork is generally regarded as the best material for this purpose. Cork has a natural period of vibration which is invariably different from that of any machine, which fact is of great importance. Cork will retain its elasticity over a long period of years, which also is important. Cork will not gradually yield under pressure like most other materials, and will neither rot, warp, swell, nor shrink. From almost every viewpoint natural cork is

an ideal material for machine iso-

In some cases the cork is placed directly under the machine on the top of the foundation, as shown in Fig. 1, and in other cases the foundation itself is built upon the cork as shown in Fig. 2, the method selected depend-



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ing upon conditions. Figure 3 shows how to isolate an electrically-driven unit, the unit being completely tied

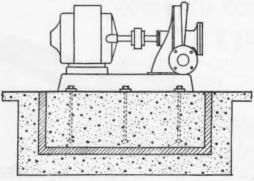


Fig. 2—In this case the insulation is placed under the foundation.

to a concrete slab in such a way that vibrations cannot be transmitted to the building and yet the machine cannot jump off from its base.

An examination of Fig. 2 will show that the machine is isolated without the use of the secondary tieing bolts

which are used in the case illustrated in Fig. 1. The machine shown in Fig. 2 is mounted on a base which is set into a pocket that has been lined with cork. This method of isolation is usually very satisfactory.

The drawing Fig. 3 shows in greater detail how the anchor bolts may be isolated. The use of rubber hose for isolating long through bolts is a particularly good idea. An objection to the use of rubber in many cases is due to its tendency to lose its

elasticity, but this fault is of little importance in connection with the use suggested here.

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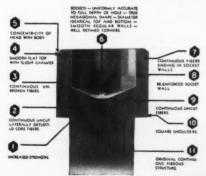
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III. 39 tant as a method of anchoring machines, and should be used in such a case as that indicated in Fig. 2. If cost of the extra bolts is comparatively unimportant.

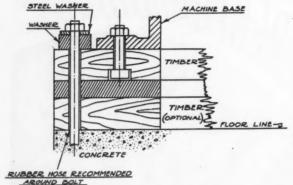


Fig. 3—Illustration showing use of rubber hose to insulate bolt from base timbers.

the machine vibrates enough to need isolating, it vibrates enough so that it should be firmly anchored. The

Reversed Opera-

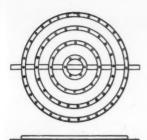
Reversed Operation Sequence Speeds Production

By ELTON STERRETT

IN the manufacture of gas burners from seamless steel tubing, the original operation schedule called for drilling both the transverse gas feeder tube and the four burner rings with ¼-in. holes so that, when assembled by welding, the holes in

the feeder registered with those in the rings to permit gas to flow to the rings. Even when drilled by jig,





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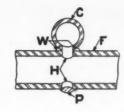
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(Left) — Drawing of Multiple Ring Burner with Transverse Feeder Pipe Welded Below Rings. (Right)—Detail of Joint between Feeder and Ring. C—Section of Ring. F—Feeder Line. H—Hole drilled to connect tubes after welding. W—Welds between tubes. P—Plug welded in unused portion of hole in feeder.

these eight holes in the transverse member were difficult to align with those in the rings, and the welding time ran high for the amount of metal deposited or lineal weld made.

On suggestion from the welder, the process was reversed, and the holes drilled after welding. The rings, assembled in proper relation to one another, were laid face (burner hole) side down, and the feeder line welded across them in the proper position. With as much of the bead as possible

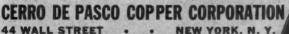
run in that position, the assembly was turned over and the bead completed. The assembly was then carried to the drill, and the desired ¼-in. hole drilled through the bottom of the feeder pipe and thence within the circle of weld through into the ring. After drilling, the burner was returned to the welder, and a plug of metal quickly spotted over the hole in the lower half of the feeder line.

The rings were made by coiling the tubing to the various ring diameters,

A 30-HOUR JOB finished in 6 hours

CERROMATRIX enabled the die maker to secure the punches in the punch plate and to make this stripper for switch rotor plates in six hours, instead of the thirty hours required by older methods. It is one of many useful, money-saving applications of Cerromatrix, the low-temperature metring allow which are described in

ture-melting alloy, which are described in the new CERROMATRIX MANUAL. Send for your free copy.



BRITISH ASSOCIATES: MINING & CHEMICAL PRODUCTS LTD., LONDON CANADIAN REPRESENTATIVES: DOMINION MERCHANTS LTD., MONTREAL

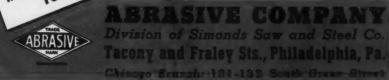




Imagine cutting-off $1^{1}/2^{11}$ round cold rolled steel stock in $2^{1}/2$ seconds! That's what Abrasive Company Cut-Off Wheels are doing regularly on high speed abrasive cut-off machines. And on production work that means important savings in time and money; to say nothing of improved quality of cut. Resinoid (synthetic resin) bonded for high speed operation up to $16,000\,\mathrm{S.F.P.M.}$, they cut practically all materials encountered in modern industry, including all types of steel, alloy steel, cast iron, brass, bronze,

aluminum, forgings, wrought iron, stone, marble, granite, brick, tile, terra cotta, hard rubber, plastics, hard carbon, porcelain, etc.

If you operate cut-off machines or have a cutting problem investigate Abrasive Company Cut-Off Wheels. Details gladly sent on request.



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Accessories for Screw Machines

cutting through on each round, and welding the ends to form a continuous tube. The revised operation schedule cut welding time 35 per cent for each burner, and shortened the drilling time even more, due to the ease with which the assembly could be spotted below the drill without special clamps such as were required for the rings and straight feeder section.

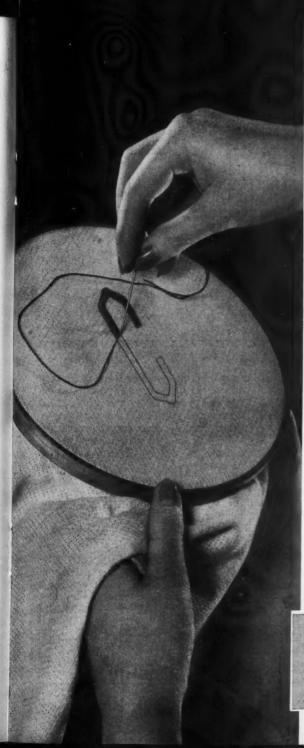
Burners made according to the revised schedule also gave much more even flame over their entire jet assembly than did those turned out earlier, due to the gas passages from feeder to rings being of the cross-section desired and full bore, instead of perhaps half cut off by overlapping edges of the two tubes at the junction.

Piercing and Stamping Die of Unusual Design

By JOHN HONEGGER

THE drawing illustrates a horntype piercing and stamping die of rather unusual design, the feature being that the piercing and stamping operations are performed at quite a distance from the anchoring place of the horn and at a section of the horn that is rather abruptly reduced from a large diameter to a smaller one.

To the large platen B is anchored, by means of screws and dowels, the anchoring block A, the platen forming the die shoe for a liner-pin type of die set. Into the block A a hole C has been counterbored for a snug fit for the horn D. A smaller hole E, bored through the block, matches the hole F in the horn D. After assembly, the holes G and H are drilled to provide a passage through which compressed air can be blown to clean out the slugs from the inside of the horn as they accumulate.



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How to Streamline a Needle

Problem: Needles must have sharp points and highly polished surfaces. But how can manufacturers put such a finish on these tiny slivers of steel ... and sell them for a few cents a package?

Answer: Streamlining a needle has become a commonplace low-cost production process, thanks to the genius of abrasive engineers and the adaptability of abrasive products such as produced by Carborundum.

To form the delicate points, the needle wires are fed between fine grit grinding wheels. Then comes the polishing. Thousands of needles are wrapped in heavy moistened canvas packets containing extremely fine grit Abrasive Powder produced by Carborundum. The packets are rolled over and over, back and forth on flat tables for a period of two weeks, covering in their movements a distance of over thirty miles. When they are opened we have the finely polished, delicately pointed, rust resisting needles which are a commonplace in every household.

AN INVITATION TO EXECUTIVES CONCERNED WITH MANUFACTURING

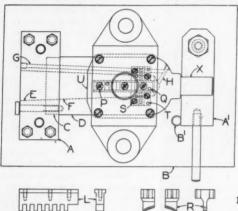
Whatever you make, there are two ways in which The Carboroudum Company's Abrasive Service can help your company. Highly trained abrasive engineers are ready to help solve any special grinding or finishing problem that may confront you. Also, without obligation, they will study your present abrasive set-up, report on its efficiency and, wherever possible, indicate how production can be improved or savings effected, Write to The Carboroundum Company, Ningara Falls, N. Y.

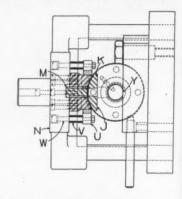


FOR ACCURACY AND ECONOMY IN MANUFACTURE

The horn is milled out as shown at J to accommodate a hardened and ground nested piercing die. This die is provided with suitable piercing slug openings into the hole F. After the die K has been screwed and doweled

shown at R, these punches being held in position by means of the screws S and the dowels T. A snugly-fitting spring stripper U is next placed around the punches, the function of the stripper plate being to prevent





Drawing illustrating design of horn-type piercing die with outboard support.

in place on the horn, the entire circumference of the horn is ground to a free fit on the inside of the bottle-like brass shell which is to be pierced and stamped in this die.

A detail of the piercing punch for piercing the slots is shown at L. This punch is fitted into a snugly-fitting slot M in punchholder N and is clamped in position by means of the screws P and dowels F. A detail of the letter stamping punches is

the stamping punches from spreading due to side thrust when stamping on the circumference of the shell. The stripper is actuated and limited in vertical movement by the stripper springs V and the stripper screws W.

Because of the distance from the anchorage at which the piercing and stamping takes place, it was necessary to provide an outboard support for the horn, arranged in such manner that it could be quickly swung





CENTRIFUGAL COOLANT PUMPS AND BY-PASS OIL RELIEF VALVES

The ideal, efficient units for installation where space is limited.

These compact, quiet units can be depended upon for long life and high efficiency.

Flexibility in installation is assured through ability to provide for exactly the position of discharge required.



Symbol FVM Vertical Type



Symbol FHM Horizontal Type



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The Fulflo By-pass Piston Type Oil Relief Valve is made in either cast iron or bronze, with pipe sizes from 1/4" to 11/2" and are suitable for pressures up to 350 lbs. They are equipped with either brass, hardened steel, or stainless steel pistons.

(Complete Information of the "Fulflo" Line Sent Upon Request)

THE FULFLO SPECIALTIES CO., INC.

into place and withdrawn again. This objective was accomplished by turning the shank X down to fit within the pierced opening of the shell.

grinding a flat Y on the under side, and then anchoring the swinging block A' in place as indicated. The stop pin B' limits the inward movement of the block. Operation of the die is self-evident.

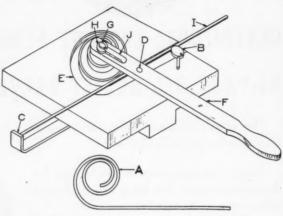
Wire Forming Fixture

By PETER L. BUDWITZ

ILLUSTRATED in the drawing is a fixture designed for forming wire to a curve similar to that of an

Archimedian spiral, as shown at A.

The fixture consists primarily of a cast iron block into which a spiral-shaped slot E has been cut. The lever F, fitted onto a stud G at the top of



Drawing Illustrating Design of Wire Forming Fixture

the spiral shaped slot, is held in place by an open-end washer **H**. A hardened tool steel plug **D** is fastened in the lever **F** as shown in the drawing. The width of the slot **E** is equivalent to the combined diameters of the wire **I** and and plug **D** plus a small amount for clearance.

In use, the wire I is inserted in the slot E with one end against the stop C and clamped by means of the camactuated clamp B. The lever F is now swung radially. As the lever is swung, the outer side of the slot E guides the plug D, which, in turn, forces the wire I to hug the inner contour or forming surface of the slot. the radius of the spiral-shaped slot is constantly decreasing as the lever is turned, the deviation is compensated for by the elongated slot J contained in the lever F. The inner wall of the slot is higher than its corresponding side, thus when the wire is placed on the surface of the bender, it is free to come in contact with the forming surface.



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MOLYBDENUM-TUNGSTEN HIGH SPEED For booklet, write The Cleveland Twist Drill Co., Cleveland, Ohio

December, 1939

MODERN MACHINE SHOP

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Outstanding





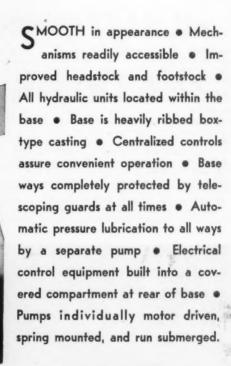
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100

...the Norton 6" Type C



NORTON COMPANY Worcester, Mass.



M-411

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very Angle

When the forming operation has been completed, the washer **H** is slipped off the stud **G** and the lever **F** is removed, thus enabling the formed wire to easily be removed from the slot.

New Books

Production Management. By A. M. Simons and Henry P. Dutton. Published by American Technical Society, Drexel Ave. and 58th St., Chicago, Ill. 597 pages, 37 illustrations and charts. Bound in durable waterproof binding. Price. \$3.50.

In discussing the subject of production management, the authors of this volume have begun at the beginning—which comprises the elements included in a scientific determination of the most logical and profitable location for an industry. This is followed by chapters on the scientific planning of the plant, the determination of production standards, scheduling for production, control of production, and all of the other fac-

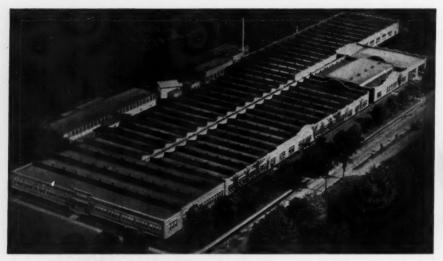
tors involved in scientific management.

The book is written in an easy style and presents a highly important subject in an exceedingly simple manner. The book should be valuable to the plant executive, the teacher of factory management, and the student.

Machine Shop Work. By Frederick W. Turner and Oscar E. Perrigo; revised by Aldrick Bertrand. Published by American Technical Society, Drexel Ave. and 58th St., Chicago, Ill. 412 pages, 444 photographs and drawings, and 27 tables. Bound in waterproof binding. Price, \$2.75.

This edition is the fifth of this popular work. It has been thoroughly revised and is now up to the minute in all details. The book is written in a clear and easy-to-understand manner and covers approved shop methods including construction and use of tools and machine tools, details of operation of machine tools, and a discussion of modern production methods.

Beginning with an exposition of the uses of the various kinds and types of measuring tools, cutting tools, and tem-



Plant of Jones & Lamson Machine Company, Springfield, Vermont, to which an extension has recently been completed. Company officials state that continuous growth of the business has necessitated more space for the production lines, which will be taken care of by this extension. The new section, which accommodates the entire administrative, clerical, and engineering forces, extends four bays back from the facade and covers an area of 24,000 square feet. The plant and office now cover four and three-quarter acres.



Designed especially for Brown & Sharpe Automatics. but suitable for hand machines as well, the Geometric Style DS Die Head is a precision tool for accurate and economical screw threading. The buffer action shank allows the tool to yield as it starts on the thread, insuring a smooth, uniform engagement of the chasers without shaving. The adjustable trip mechanism is unusually sensitive, eliminating the possibility of stripping threads. It may be set to cut an accurate length of thread, so that close camming is unnecessary. On B. & S. Automatics the head may be closed automatically by a stop on the bed of the machine, contacting the closing attachment.

Like other Geometrics, this tool is hardened and ground throughout, built to close limits, carefully tested and inspected. The Style DS Die Head will cut smooth, accurate screw threads on your work—and save you money. May we send you our booklet?

THE GEOMETRIC TOOL CO.

NEW HAVEN, CONN.

plates, the reader is lead into a discussion of various kinds and types of machine tools and their uses in metal manufacturing. The author starts with the simplest of mechanical operations in which these machines are involved, and leads on progressively from the simpler types of work to the more difficult. All of the modern machine tools are discussed, including automatic screw machines. The book should be invaluable to an apprentice instructor or to a student of machine shop work who is in position to make use of the information contained in this volume.

Machine Design. By Stanton E. Winston, Assoc. Prof. of Mechanical Engineering, Armour Institute of Technology. Published by American Technical Society, Drexel Ave. and 58th St., Chicago, Ill. 333 pages, 145 illustrations, 26 tables. Bound in water and vermin-

proof cloth. Price, \$3.00.

The subject of machine design is a very important and interesting one. It is broad in its scope and offers many specific lines in which to specialize. However, underlying the machine design field are many basic fundamentals of theory and analysis and a great deal of factual information with which any prospective designer must be acquainted. This book deals with those fundamentals in a practical, "how-to-do-it" manner.

The contents include: Fundamental Principles of Simple and Compound Stresses; Bolts and Screws; Cylinders and Riveted Joints; Shafting and Keys; Couplings and Clutches; Wrapping Connectors and Their Pulleys, Sheaves, or Sprockets; Friction Drives and Spur and Bevel Gears; Miscellaneous Details of Design, and Index. The book is filled with solutions of many examples worked out in detail.

Look and Listen; The Television Handbook. By M. B. Sleeper, Television Engineer. Pub. by Norman W. Henley Publishing Co., 2 West 45th St., New York, N. Y. 96 pages 6½ x 9 in., more than 100 illustrations. Price, flexible binding, \$1.00. Cloth binding, \$1.50.

binding, \$1.00. Cloth binding, \$1.50. In "Look and Listen" is presented definite, concrete information about the status of television as of April 30, 1939—the inaugural date of telecasting—and a complete disclosure of the operation and construction of the latest television transmitting and receiving equipment.

The book answers the questions of the reader with simple explanations and profuse illustrations. The book is of special importance and value, being the only book written thus far by a member of an organization actually manufacturing television equipment and presenting first-hand knowledge of this subject, written with engineering accuracy and detail.

Janette "Precision Bullt" Speed Reducers. Nineteen different types including forty-three different sizes of Janette motorized and motorless speed reducers are illustrated and described in Bulletin 22-11 now being published by Janette Manufacturing Company, 556 W. Monroe St., Chicago, Ill. Copy free upon request.



Addition to Atlas

Production capacity at Atlas Press Company, Kalamazoo, Mich., has again been increased by a recent plant addition which provides new working area of 17,000 square feet. The added floor space steps up manufacture of the company's lathes, shapers, drill presses, and arbor presses. An addition of approximately the same size was completed in November, 1937.

announcing the AIRMASTER PROTECTS EQUIPMENT SAFEGUARDS HEALTH PRICED LOW FITS ALL GRINDERS & BUFFERS sizes: for wheels up to 10", 11/2" face, Here's the health officer of the grinder crews. THE CINCINNATI Air \$125; over 10" and up to 14", 3" Master purifies the air. Sucks dust face, \$150. Easy to install, easy to clean. Prompt shipment. Write today and grit right off the grinding wheels. returns the air fresh and pure. Fits for bulletin-stating your requireany make grinder, available in two ments. Satisfaction guaranteed! ıncinnati ELECTRIC DRILLS . GRINDERS . BUFFERS . PORTABLE TOOLS 2808-6 MADISON RD.

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CINCINNATI, OHIO

Over the Editor's Desk

War Profits

IT IS interesting to note the change in the attitude of America toward war that has taken place during these

past twenty years.

The so-called "World War" of 1914-1918 was the greatest war of all history, the cost for each day's fighting amounting to a sum that in former ages would have paid for an entire war. The World War created a demand for war materials that was eagerly accepted by American manufacturers as an opportunity to make money - and many of them did, in huge quantities. Prices soared; wages soared; negro workers imported from Southern states received more for a day's work than they had been used to receiving for laboring an entire week: merchants stocked their shelves with high priced merchandise; manufacturers got rich.

Even after the war had ceased, the boom continued. Then the bubble burst and wages and prices slithered downward so fast that merchant, manufacturer, and buyer alike were bewildered by the chaos which ensued. Business was at a standstill for months, then slowly began the climb toward normal. But the effect of the war boom and subsequent crash persisted for years, and many economists contend that the greater business crash of 1929 was also a result of the abnormal situation created by the war.

At least one thing was learned, and that is that no permanent good can come from war profits. So far as the supply angle was concerned, we learned many things as a result of our war experience. The first was that if war profits are made without restriction, they are made by the few at the expense of the many. The second was that no permanent good results from profits made out of the hell that is war.

Early in 1915 the European belligerents turned to the United States for war supplies, and American businessmen scrambled for their share of the gravy. In contrast, since the recent outbreak of hostilities American business has gone on record as wanting no part of the war or war profits. We are still exporting machines and tools, to be sure, but, generally speaking, industry is not embarking on a program of expansion in anticipation of fat war orders.

The less effect foreign wars have on the normal course of American business, the better off we are going to be when it is over over there.

Greetings

THE Season of Gifts and Greetings approaches, and accordingly we take this opportunity to express our appreciation for the cooperation of the manufacturers who have through the past year lent us their support by means of their advertising and for the cooperation of those of our readers who have referred to this publication when sending inquiries to advertisers. May your Christmas be the merriest and your New Year the happiest of any you have ever seen.

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TWIST DRILL AND MACHINE COMPANY

NEW BEDFORD, MASS., U. S. A.

NEW YORK STORE: 130 LAFAYETTE ST. - - CHICAGO STORE: 570 WEST RANDOLPH ST.



Fellows Horizontal Z-Model Gear Shaper

The Fellows Gear Shaper Company, Springfield, Vt., has placed on the market the Horizontal Z-Model Gear Shaper shown in the illustration. The machine is of the horizontal type, and is particularly suited to the machining of gears or clutches that are integral with long shafts, such as the aeroplane engine crankshaft visible in the illustration. The work spindle is mounted in a slide which is adjustable along the base for positioning the work relative to the cutter. The slide also carries a bracket which retains a swinging shoe that supplies an additional support for the work. This shoe can be lowered to remove and insert the work. The work is held in an adapter retained in the work spindle, the latter having an 18-in, diameter straight hole.

The cutter-spindle, which is of the "relieving" type, is held in the head slide, the latter being adjustable along

the base in a direction at right angles to the work slide. Movement of this slide controls the diameter setting of the cutter with relation to the work. The cutter spindle is controlled by a guide in a similar manner to the regular gear shapers. An extremely smooth acting and positive cutter spindle relieving mechanism is employed. The machine is also provided with an electric push button control, and a mechanism which stops the machine when the work is completed.

Maximum capacities are: movement of work slide, 19 in.; movement of cutter slide for external gears, 6½ in.; for internal gears, 2 in. Maximum pitch radii of work are determined as follows: for externals, subtract the pitch radius of the cutter from the center distance 6½ in.; for internals, add the pitch radius of the cutter to 2 inches.

Doall Grinder

A machine which, by the use of inter-

changeable heads, can be used either for precision surface work or for universal cutter grinding has been developed by Continental Machines, Inc., 1306 S. Washington Ave., Minneapolis, Minn.

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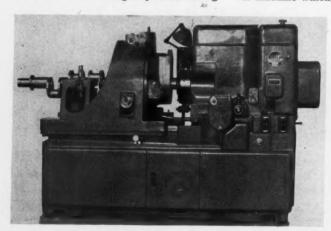
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Front view of Fellows Horizontal Z-Model Gear Shaper for cutting gears and clutches on long integral shafts.

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To use as a precision surface grinder, it is necessary only to attach the motor spindle head and clamp the magnetic chuck on top the machine work table. The lateral movement of the work table rides on ball bearings. Hardened and ground steel wear strips which can be removed and reground are provided in the long table ways. When worn past the normal life of the machine, new steel balls can be installed and the ways reground.

The same basic unit with a ball bearing work table can be used as a cutter grinder. Thus both the initial cost and floor space can be saved by the use of one machine with interchangeable heads. Inside the base room is provided to accommodate the head and fixtures not in use. The changeover time from surface grinding to tool grinding requires but a couple of minutes.

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For surface grinding, a super - balanced, in-built motor driven spindle is provided. The spindle is a completely enclosed unit, ball bearing mounted, and with a long support. The 1 h.p. in-built motor eliminates the need for belt drives and idler pulley, minimizing vibration and assuring a finer grinding finish. Extreme accuracy is said to be ensured by the special bearing construction which eliminates end play of the spindle. The wheel spindle may be set at any angle up to 30 degrees.

To use a universal cutter grinder, it is necessary only to attach the special Dumore head and lay the compound table on top of the machine work table. Infinite planes of full circle movement of the wheelhead allow maximum capacity for the cutter grinder. A multitude of angles, sizes, and shapes for sharpening are provided for by the new limits of capacity and flexibility of this machine. The dividing head of the machine has

two graduated axes and can pass laterally across the compound table at any angle with the use of the hand lever. An exclusive feature of the grinder is



Doall Grinder

the cold light method of illuminating the work. The back edge of the wheel cover forms a reflector which carries a 9-in. fluorescent lamp of tubular design which gives off a cold light, thus eliminating the possibility of heating and distorting the work from localized high



temperature lighting. No electric current is necessary to energize the magnetic chuck since it contains a series of permanent high power magnets of unusual strength.

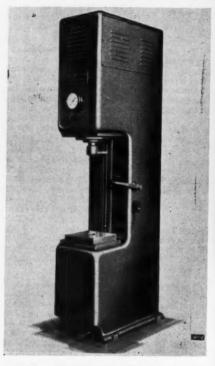
Denison Type DLAC 1 Hydraulic Press

The illustration shows a vertical hydraulic press which has been designed by The Denison Engineering Company, Chestnut and Water Sts., Columbus, O., especially for production operations on straightening, assembling, broaching, pressing, and so on. The press is of vertical design and of electric welded steel construction, providing the rigidity which is essential in such a machine.

The cylinder assembly consists of an accurately finished steel cylinder fitted with nickel iron cylinder heads, piston, steel piston rod, and self-sealing packing, the assembly being flange-mounted in the upper part of the frame. Behind the cylinder is located the hydraulic pump, which is integrally flange-mounted on its driving motor. The oil reservoir is located under the motor com-

partment. The ram is guided against rotation by machined alloy guides in the throat of the press. The magnetic motor starter and pressure and directional controls are also located within the frame.

All corners and edges of the frame



Denison Type DLAC 1 Hydraulic Press

are rounded, reducing the accident hazard and providing attractive design. Ample toe space is provided beneath the frame at the front and careful attention has been given to the location and operation of the hand lever and foot pedal.

Stepping on the foot pedal or operating the hand lever causes the ram to move down until either the ram contacts the work with full pressure or until the lower stroke limit is reached, at which point the ram automatically reverses. The adjustment for maximum pressure is accessible through a door in the rear panel. Stroke adjustments for



Ordinary Diamond Dressers Need Special Care But The CARBOLOY Dresser Can "Take It"

Carboloy Dressers stand abuse because they don't depend on one diamond. Instead, they have a multitude of sharp, diamond cutting points permanently held in a special matrix. To get a new cutting surface just give the dresser a quarter turn in its holder. No remountings! No worries! Lower cost! Send for catalog DR-38.

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DIAMOND IMPREGNATED WHEEL DRESSERS



SOLVING THE HARD ONES

Many a design problem that used to be troublesome is being worked out these days by the use of modern materials. Take logging trailer brake drums, for example.

Holding back 50 ton loads on long, steep grades and running high temperatures is all in their day's work. But, by making his drums of Chromium-Molybdenum (0.35-0.45% Cr.; 0.35-0.45% Mo.) iron, one of the leading manufacturers has more than met the severe operating conditions.

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The iron is strong and tough, with good

resistance to abrasion. Furthermore, It retains these qualities after repeated heating to around 900 degrees F. followed by rapid cooling. In addition the Molybdenum content reduces the tendency to distortion due to heating—thus reducing the pounding action that leads to premature failure.

Perhaps a re-check of your own materials specifications is in order. Our technical booklet, "Molybdenum in Iron" will prove helpful. It is free on request to production executives and engineers.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

Climax Holy of name Campany 500 First Ave L. N. York City



112 MODERN MACHINE SHOP

December, 1939

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... But a 35% waste in production capacity was hidden here until banished by Tide Water Cutting Oil

"Our best run on threading machine operations was only two hours, with 45 minutes out for sharpening and replacing. We changed to Tide Water Cutting Oil. It revolutionized the entire shop. Now, the machines run 20 hours before any grinding is necessary.

"Units made of hexagonal stock, which are threaded externally are made at the fast rate of 18 per minute. We now make 21,600 pieces during the 20 hours use before the tool needs sharpening. Only 15,930 were formerly produced in the same time. Tide Water Cutting Oil increased our production slightly over 35%."

Dollar and cent savings like this are typical tributes to the high quality of Tide Water Cutting Oils. They banish tarnishing...increase tool life... assure finer finishes. Call in a Tide Water engineer. His services are freely offered to help you uncover hidden wastes. He will recommend the lubrication "engineered to fit the job."

Regional Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

TIDE WATER ASSOCIATED OIL COMPANY

TIDE WATER DIVISION, 17 BATTERY PLACE
New York, N. Y.

N-TARNISHING

CUTTING OILS

CIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE

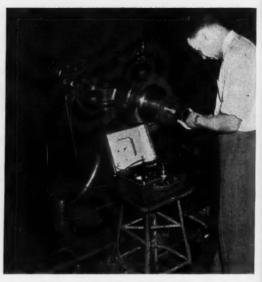
both upper and lower positions are made from set collars located between the ram guides. The press is a complete unit, requiring only power connections for the motor and filling of the oil reservoir to make the press ready for operation. The press can readily be equipped with accessories for broaching or similar operations.

G-E Portable Dynamic Balancing Machine

Vibration in heavy rotating machinery is a serious matter which may involve considerable expense for repairs to the vibrating machine and nearby equipment. To combat this expense, General Electric Company, Schenectady, N. Y., has produced a portable dynamic balacing unit for use wherever rotating masses require balancing to eliminate vibration.

The device is a self-contained precision instrument capable of measuring the amount and phase angle of unbalance vibration present in the bearing pedestals of a rotating machine running in its own or substitute bearings at any speed between approximately 600 and 5,000 r.p.m.

Being portable, it permits the successful balancing of rotating equipment without the removal of the rotor from the machine and the balancing of rotors that are too heavy for previously available portable balancing machines. Because the balance is made under operating conditions this equipment improves the quality of the result, as the

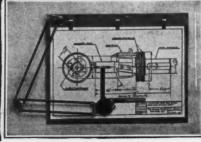


G-E Portable Dynamic Balancing Equipment

changes affected by load and by the foundations are included. It has also been found a time-saver in balancing auxiliary equipment in central stations and manufacturing plants, as the number of trial runs required are reduced to a minimum of three. In some cases it is essential to perform balancing operations with this equipment as it is frequently impractical to balance rotating machines by trial and error methods.

The complete equipment, packed in a single case with no batteries or external power source required, consists of a sine-wave alternator, a vibration pickup, and an instrument with its asso-

DRAFTO



DRAFTO MACHINES are complete units for use in Office. Shop, Home and School. Equipped with horizontal and vertical scales and 180 degree protractors. Mounted on special tempered Masonite Boards fitted with sturdy paper clamps. Size 10-H fits brief case; dwgs. up to 9x12 in.—84.50. Size 15-V for patent dwgs., charts, graphs; dwgs. up to 10x15 in. in vertical position—\$6.25. Size 20-H for desk use in office, shop, home, or school; dwgs. up to 12x18 in.—\$9.50. Postage prepaid on cash orders. \$1 must

\$5.50. Postage prepaid on cash orders. \$1 must accompany C.O.D. orders.

Write for Catalogue on larger sizes.

THE DRAFTO GO. Cochranton, Penna.

Midwestern Branch: 1048 N. Lockwood Ave., Chicago, Ill. tir Tr

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effects a stronger riveted joint at rates up to 3200 rivets an hour and creates additional savings by making possible the use of solid rivets.

The riveting is accomplished smoothly, automatically, and with precision. The setting action is actually one of "Coining." The motion proceeds from a fast approach to the riveting position to a slower setting action—giving the metal time to flow.

The Rivitor is shown here "staking" 3/16" x 5/8" lg. solid rivets for reel and blade assembly.

These machines ably handle many jobs in many industries. Submit samples of your riveting jobs. We should like to show you the type of solid rivet joints that can be effected automatically. We should like you to realize savings that will help you toward your better product.

this is a TOMKINS-JOHNSON product

Factory at 620 N. Mechanic Street, Jackson, Michigan. Agents in principal cities. T-J products also include Air and Hydraulic Cylinders...Remote Control Systems...Rotating Chucks and Cylinders...Clinchors...Special Equipment...Brownie Coolant Pumps...T-J Die Sinking Milling Cutters.

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ciated circuit on which mils displacement of the vibration are read.

In balancing any equipment, the sinewave alternator spindle is inserted in a lathe center hole in either end of the rotor of the machine to be balanced, and the vibration pick-up is placed against the rotor bearing. The two voltages generated in the sine-wave alternator and vibration velocity unit are applied to the measuring instrument. Then the amount of vibration in mils and the relative angular position of the high spot are determined. This measurement is made with the machine in its original condition and also with two trial weights attached. Then, from these measurements, calculations are made on a form sheet to determine the final weights and their location to be applied to correct the original unbalance.

Reed-Prentice Keyseating Machine

Designed for the machining of keyways, slots, splines, recesses, and so on, the keyseating machine shown in the illustration—product of Reed-Prentice

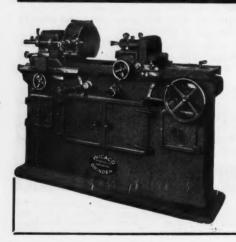
Corporation, Worcester, Mass.—can also be used as a light type hand feed vertical milling machine. This feature, plus the high range of spindle speeds available, warrants its consideration for general toolroom work.

The column is a rigid one-piece casting with a coolant pump in the base. Table, saddle, and knee are provided with hand feed in all directions. The spindle head is reciprocated by adjustable crank motion through a compensating device which provides constant speed of slide in both directions. A lock is provided so that the machine can be used as a hand-operated milling machine. The spindle unit is in the form of a sleeve with the spindle mounted on dual ball bearings. The spindle nose has a split-collet type chuck and the drive pulley is mounted independently of the spindle.

Besides hand feed, five rates of automatic down feed are provided to the spindle sleeve. Feeds are independent of the reciprocating travel of the spindle head. A depth scale is provided which operates in conjunction with a trip motion. Eight spindle speeds are available as follows: 290, 510, 640, 800, 910, 1300, 1700, and 2350 r.p.m.

5 Precision Features of the

WICACO Internal Precision GRINDER



- 1. Rigid work-head.
- 2. Instantaneous reverse.
- 3. Water-cooled wheel-head.
- 4. Vibration minimized by underslung drive.
- 5. Positive stop for blind hole grinding.

These five features of the WICACO GRINDER assure accuracy — put you way behind the tolerance decimal point. Write for complete details — today.

THE WICACO MACHINE CORP.

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NATCO B-225H DRILLER

FOR RAPID DRILLING
EASE OF OPERATION
DEPENDABILITY

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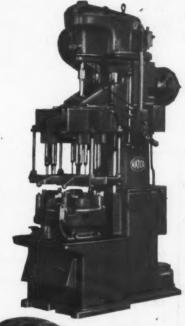
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This NATCO B225H Machine Drills and Countersinks Nine Holes in 150 Valve Plates Per Hour.

This NATCO B225H drill head driller is being used by a prominent manufacturer. It is built with an 18-spindle drill head and a five-position fixture mounted on a hand indexed rotating table. This machine is of simple sturdy design . . . is easy to operate and will stand hard usage over long periods with little maintenance expense. Write today for complete literature.





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Richmond, Indiana, U. S. A.

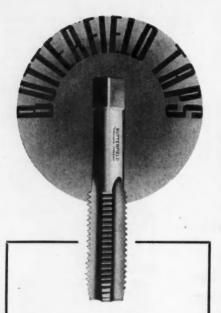
NATCO

Drilling, Boring and Tapping Machines

December, 1939

MODERN MACHINE SHOP

117



You get more "thread mileage" per tap when you use Butterfield Taps.

They'll produce a "Class 2 Fit" until entirely worn out.

Next time you buy, specify Butterfield High - Speed Steel "Commercial-Ground" Taps.

UNION TWIST DRILL COMPANY BUTTERFIELD DIVISION

Factories: DERBY LINE, VERMONT Athol, Mass. • Mansfield, Mass. Rock Island, Quebec, Canada The machine is driven by a two-speed vertically mounted flanged feeding motor for 200 or 550 volts, three-phase, 50 cycles, and from 4 to 5 h.p. Power is transmitted by means of V-ropes passing over spring-loaded jockey pulleys. One drive provides a choice of six speeds to the cutter spindle, and the other,



Reed-Prentice Keyseating Machine

driving to a worm reduction box mounted inside the column, provides a choice of four rates of reciprocating travel to the spindle head for each spindle speed. The whole drive is enclosed by a hinged cover which permits easy access for speed changing. The cover is interlocked electrically so that belts cannot be changed while in metion.

Maximum keyway that can be cut with automatic crank drive is ¾ x 5 in. Including the table adjustment, the length can be increased to 20 in. Maximum depth of keyway cut, automatically, 2¾ in. Maximum distance from cen-

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Ridiculous!

Yes, of course it is.

But just the same, you'd be surprised to know how important it is to have a copy of the Barnes Metal Cutting Manual within easy reach. Everyone of its thirty-two pages is crammed full of usable information dealing with the proper selection and correct use of hack saw blades and band saws.

If your regular distributor can't supply you with a copy of this valuable little booklet, write to us today.

No charge!

W. D. BARNES CO. INC.

ter of spindle to column above the V's. 10 in.; to face of slide ways, 81/2 in. Distance from spindle nose to table surface, 12 in. Working surface of table, 26 x 9 Maximum table movement by hand, longitudinal, 15 in.; transverse, 6¼ in.; vertical, 12 in. proximate net weight. 1,500 lbs. Standard equipment includes one set of collets of 14, 16, 38, 16, 1/2, and 5% in., internal belting, spanners, and handles.

"L" Series Chicago Steel Press Brake

Shown in the illustration is the "L" Series Chicago Steel Press Brake for bending, forming, and punching sheet

metal, which has been announced by Dreis & Krump Manufacturing Company, 7418 S. Loomis Blvd., Chicago, Ill. Features of the brake include streamlined design with all gears and working parts enclosed and running in oil, and a new type cushioned friction clutch.

Housings, ram, bed, and all main members are constructed of steel plate. The press is of the crankless type, having a compact compartment of gears and eccentrics enclosed and running in a complete bath of oll. Power is delivered to the ram at both ends. The main



"L" Series Chicago Steel Press Brake

bull gears and eccentrics are one piece. Double back gearing gives smooth reserve power. The adjusting screws are encased in sleeve-like plungers and opera'e in a vertical non-oscillating position throughout the stroke. Thrust to the ram is always delivered direct.

The friction clutch has only one moving part and requires practically no adjustment. The brake is combined with the clutch and both operate by a simple direct movement. A variable speed drive operates the ram at any speed from 15 to 45 strokes per minute. This is a



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HANNIFIN PNEUMATIC ARBOR PRESSES

Furnished with steel frames and Hannifin high-efficiency air cylinders

Continued high-efficiency operation is assured by the exclusive Hannifin air cylinder design used in Hannifin arbor presses. Simple outside adjustment of the cylinder piston packing makes it easy to maintain efficient piston seal, delivering full power. Cylinders are bored and then honed, producing a straight, round, perfectly smooth cylinder interior. Perfect piston fit in a highly finished cylinder bore prevents leakage and waste of air power, assures minimum friction loss.

Hannifin Arbor Presses are built in capacities from 600 to 50,000 lbs., for assembling, broaching, molding, keyway cutting, straightening, bending, forming, and similar work. Also with the Hannifin patented oil cylinder speed control where a steady, controlled ram stroke is required. Write for Bulletin 46 with complete specifications of all types.



Model B-2 Arbor Press built in capacities from 1700 lbs. to 18,000 lbs. Many other types available, both floor type and bench type.

HANNIFIN MANUFACTURING COMPANY

621-631 South Kolmar Avenue . Chicago, Illinois

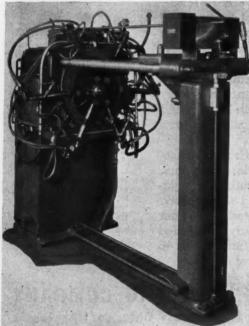
ENGINEERS - DESIGNERS - MANUFACTURERS - PNEUMATIC AND HYDRAULIC PRODUCTION TOOL EQUIPMENT

definite safety feature, as well as a means of timing the machine to the work.

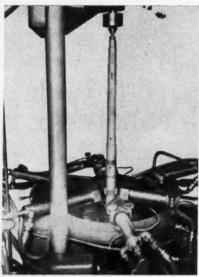
The machine is made in three sizes, to bend $\frac{3}{18}$ -in. plate 4 ft. long and up to 14-gauge sheets 10 ft. long. The stroke is $2\frac{1}{3}$ in.; adjustment of ram, 3 in., and die space, $6\frac{1}{2}$ inches.

Fellows Flame Hardening Machine

The Fellows Gear Shaper Company, Springfield, Vt., has placed on the market a flame hardening machine intended for local hardening of gear teeth and other parts made from oil-hardening stock. This machine has been designed to cover a wide range of pitches and sizes of gears and to handle such work with universal equipment. It also provides a quick and reliable means for handling a large variety of other parts with the minimum of time required for



Fellows Flame Hardening Machine for hardening gears without quenching tank,



Heating a small pinion on a long integral shaft.

changing the set-up. In operation, the gear is rotated and the entire circumference on which the teeth are cut is brought to the proper temperature within a short period of time.

The work to be hardened is held either on a stub arbor or between centers, depending upon the shape and character of the work. The work is driven from the headstock spindle, the latter being rotated through an adjustable speed texrope drive from a motor, and giving a speed range from about 125 to 800 revolutions per minute. Foot treadles located at both ends of the machine operate an ejector for removing the work from the stub arbor and a transfer device immerses the work quenching medium.

As shown in the second illustration, the work is surrounded by six torches, each torch having a number of nozzles. The torch equipment, which is designed especially for use on the machine, is carried on a saddle that is mounted on

WILSON Acknowledged Accuracy

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at ogor and is moved along two brass pipe supports, permitting the torches to be located in the desired relation to the work. The elimination of a bed or other obstruction beneath the work affords ample room for the insertion of a quenching tank. The saddle carries all of the torches, pipes, and valves for controlling the flame equipment.

The number of torches and nozzles used depends upon the diameter, face width, pitch, and so on, of the work. Any number of torches can be made inoperative by shutting off the oxygen and acetylene gas. A single valve is used for the gasses supplied to the torches and is opened by hand from either end of the machine. An electrical timing device can be provided for automatically closing the valve when the correct heating time has been determined. The saddle, saddle supports, torch carrier and plate at the rear work are cooled by circulating water, thus permitting changes to be made without danger to the operator. Maximum capacities are: 12-in. diameter, 2-in. face, and shaft lengths up to 36 inches.

Seam Welder with Weltronic Interrupting Timer

Continuous automatic spot welding, using a seam welder, is now possible largely by the adaptation to a seam welder of a Weltronic timer which accurately controls the timing of the welding operation and provides an automatic repeating cycle.

The machine was designed and built by Expert Welding Machine Company, Detroit, Mich., and the construction includes a Model No. 80 timer which is a product of Weltronic Corporation, 2832 E. Grand Blvd., Detroit, Mich. The timer makes it possible for the machine not only to make accurately spaced spots but also, by means of an adjustable control, to adjust the length of the spots to the exact amount desired irrespective of production rates. The ma-



Weltronic Interrupting Welding Timer enables continuous operation seam welder to spot weld oil baffle plate to valve cover plate.

chine was intended for the purpose of series spot welding 19-gauge baffle plates to 18-gauge valve cover plates for six and eight-cylinder cars and includes a conveyor for carrying the work under the seam rolls, a 50 KVA transformer,



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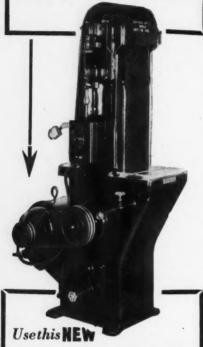




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PORTER-CABLE

"G-8" Belt Grinder

Many grinding jobs need a truer plane surface than can be achieved easily on a grinding wheel. The new PORTER-CABLE "G-8" BELT GRINDER is built especially for this type of work. Fits right into continuous production lines. Extra-size shafts, heavy ball bearings sealed against dust. 9-foot high-speed belt—cuts faster, cools quicker—has greater grinding area. Easily adjustable for tension and tracking enclosed for safety. PORTER-CABLE G-8 Belt Grinder can help you oreal production jobs, accurately and at big savings. Write today for full information and prices.

PORTER-CABLE MACHINE CO.

300 WOLF ST.

SYRACUSE, N. Y.

timer, contactor, and is thus completely self-contained. As the conveyor carries a loaded die into the rolls, a cam on the side of the die trips a valve which admits air into the pressure cylinders that bring the rolls into contact with the work. A limit switch automatically starts the timer. Immediately after the last spot is completed, the cam on the side of the moving die releases the pressure switch, cutting the timer and raising the rolls from the work.

The timer carries dial controls for setting "current on" and "current off" time, both adjustable in one-cycle steps to from 1 to 30 cycles of current, permitting accurate control of length and

spacing of spots.

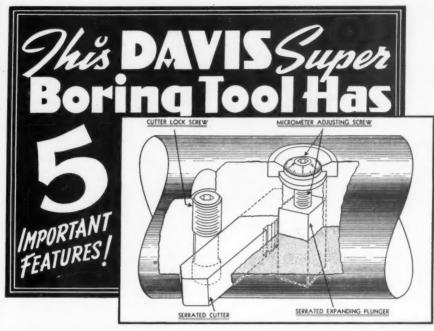
Although designed for a production speed of 450 pieces per hour, the machine is readily adjustable to suit any speed required in relation to flow of parts in production. Change in conveyor speed is compensated for by changing the dial setting on the timer, thus retaining the same length and spacing of spots irrespective of production rate.

G-E Variable-Voltage Planer Drive

A variable-voltage drive for reversing planers, recently announced by General Electric Company, Schenectady, N. Y., offers the advantages of wide speed range, extremely fast acceleration and deceleration, high cutting efficiency, accuracy in stopping, and a simple system of control. In addition, the equipment gives independent selection of cut and return speeds throughout the entire speed range if desired, together with a maximum number of strokes per minute on all lengths of stroke.

Tests have shown that production increases ranging upwards from 25 per cent may be realized with the use of this drive on modern planers. The drive itself consists of a direct-connected planer drive motor and an independent motor-generator set. So far as the control is concerned, a maximum of nine contactors and relays constitute all operating devices on the control panel. Table speeds up to 240 ft. per minute can be obtained by using suitable gear ratios in the planer.

Both the rotating equipment and its control are designed to operate with low maintenance costs. The rotating apparatus has excellent commutation characteristics.



 ACCURACY: Precision built, assuring extremely accurate results.

 INTERCHANGEABILITY: Uniformity of design and structure allow a rapid change of set-up.

3. RUGGED CONSTRUCTION: Permits with safety, increased speeds and feeds.

- ECONOMICAL: Universal in application, one tool covering a wide range of bores. Very effective with T. C. tipped cutters.
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SEND US PRINTS OF YOUR WORK FOR A SPECIAL RECOMMENDATION.



BORING TOOLS

DAVIS BORING TOOL DIVISION

Larkin Packer Co., Inc.

St. Louis, U. S. A.



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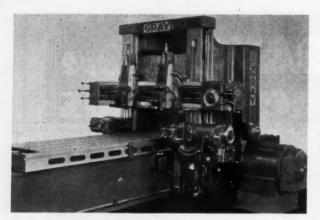
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G. A. Gray Double-Housing Planer Equipped with G-E 35 H.P. Adjustable-Voltage Drive

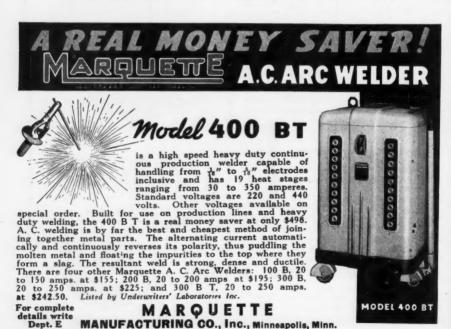
acteristics and, because of low armature inertia, operates with low current peaks. The small amount of current handled by the control equipment results in little or no contact burning.

Westinghouse Heat-Treated Gears for Industrial Use

A complete line of heat-treated gears for heavy-duty industrial application has been announced by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. These gears, heat treated by the Barnes process (BP), are especially designed for long life and dependability under adverse operating conditions, such as in cranes, mine hoists, locomotives and in

rubber, flour, cement, quarrying, and metal-mining machinery.

Heat treatment by the BP method gives the gears a hard wearing surface, tapering off on the inside to an extreme-





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UNBRAKO

SOCKET SCREWS

Fit For The Toughest Jobs

Improved new alloys, up-to-date heat treating methods, precision machining and rigid inspection — four reasons why "Unbrako" Screw Products can be depended upon to meet the severest requirements.

Uniform accuracy assures you of a consistently perfect fit. The "Better Gripping

Head" of the Knurled "Unbrako" Socket Head Cap Screw saves lost production time and makes for neatness in the finished job. "Unbrako" Socket Screws belong on your machines.



Fig. 1434 Knurled "UNBRAKO" Socket Head Cap Screw with the "Better Gripping H.ad." Pats. Pend.



Fig. 232
"UNBRAKO"
Hollow Set
Screw.

Write for "UNBRAKO" Screw Products Catalog and Samples

STANDARD PRESSED STEEL CO. JENKINTOWN, PENNA.

Boston Detroit Indianapolis

Box 556

Chicago St. Louis San Francisco ly tough core. This characteristic of the process produces not only long wearing gear teeth, but also high shock resistance because of the tough core.

Gears in this new line ordinarily have approximately four times the life of an untreated gear or pinion under the same service and operating conditions. The rate of wear is nearly constant throughout useful life.

H.E.C. Model MMVT Honing Machine

The Honing Equipment Corporation, 4612 Woodward Ave., Detroit, Mich., has added to its line a honing machine



H.E.C. Model MMVT Honing Machine

for honing bores up to 2-in. diameter and 5 in. long. The machine, known as the Model MMVT, can be supplied as shown in the illustration. This type of machine has an adjustable work table for small parts and a work table ar-

Phila

Dec

15 to 20 times ER LONGER Hardened and Ground SLEEVES and **EXTENSION SOCKETS** from MIDWEST give you this greatly increased length of life because they are HARDENED and ground by precision methods. 7 Styles—101 taper combinations. Write for Bulletin 16J. MIDWEST TOOL & MFG. CO. 2344 W. Jefferson, Detroit

Contact your nearest Midwest office—Cincinnati, Cleveland, Chicago, Indianapolis, New York, Philadelphia, Pittsburg, Salt Lake City, Springfield, Mass., St. Louis, Syracuse, Tulsa, Toledo.

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ranged on the base for large pieces with small bores. The head of the machine can be furnished mounted on a bench plate, which can be arranged in batteries of two or more on a work bench or on a specially designed table. The drive is provided with four-step V-belt pulleys which give four changes of speed to the rotation and reciprocation.

The machine is of sturdy construction. All mating parts are machined to close tolerances for long life. Self-lubricating, anti-friction bearings are used where necessary. The drive spindle is splined and arranged for chuck or magic shank, for lift out, and quick removal of the honing tool. The stroke is infinitely variable for the length of bore. The machine is said to give highest quality of precision and finish.

A separate coolant system complete with pump, electric motor, filter and reservoir can be provided.

Porous Bronze Retainers for Fafnir Ball Bearings

For specialized applications, The Fafnir Bearing Company, New Britain, Conn., has announced ball bearings incorporating retainers made of oil-impregnated bronze. Holding and slowly feeding sufficient oil to lubricate the ball bearing throughout its entire life, this retainer is said to be ideal for applications that are inaccessible, or subject to sub-zero temperatures.

The retainer is fabricated from a strong, die-pressed bronze. Its porous structure forms a reservoir for the retention of as much as 25 per cent of its volume of oil. The microscopic pockets hold the oil and also maintain the oil film between the ball surfaces and the retainer pockets. The oil is fed from the porous retainer at the correct speed for proper lubrication.

In sub-zero applications, where even light grease will harden and cause extremely high starting torque, these bearings provide a minimum of drag. Thorough tests, covering a period of five years, have laid the foundation for the application of this retainer material to ball bearings. Test bearings started in operation in 1934 are still running without any addition of lubricant, although they have been in operation continuously, 24 hours a day, under varied speeds and loads.

GUSHER

PORTABLE PUMPING UNITS

For machines not originally equipped with pumps or reservoirs. Standard capacities are 4 gallons and 11 gallons. Special tanks can be built to your specifications. Immersion Type UL is shown here but any style of GUSHER immersion pump can be used with these portable pumping units.

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The Ruthman Machinery Co.



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YES-UP TO 21- INCH BORE!

ability to carry loads and stand up to punishing jobs. Yet they have all the PRECISION, the fineness, the friction-free smoothness, of their pigmy brothers in the NORMA-HOFFMANN line. ***

Rugged giants they are, in their And, between the biggest and the smallest, a complete range of sizes is available-each marked by the family quality of PRECI-SION.*** There's a PRECISION Bearing (ball, roller or thrust) for every load, speed and duty.

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VRMA-HVFFM

BALL, RVLLER AND THRUST

NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONN., U. S. A.

939



Front view of No. 12M Involute Measuring Machine equipped with electrical recording

Fellows No. 12M Involute Measuring Machine

The Fellows Gear Shaper Company, Springfield, Vt., has placed on the market an addition to the line of involute measuring machines previously announced. This machine, which is known as the 12M Involute Measuring Machine, is similar in design to the No. 6M except that it is larger and heavier in construction to accommodate the increased capacity.

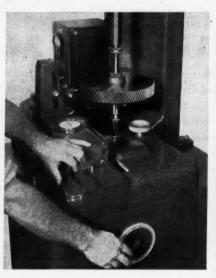
The work spindle is mounted in preloaded bearings of special design to retain accurate alignment and ensure rigidity. It is rotated for "rolling" the involute by a "friction" wheel to prevent imposing any unnecessary strain on the mechanism. The work spindle sleeve is adjustable vertically to position the gear in the correct relation to the involute pointer. It is possible to check the individual gears on a cluster, for instance, without removing the gear from the machine. A "dead" center is held in the work spindle sleeve and a "live" center in the tailstock. The tailstock is also adjustable through a rack and pinion and counterweighted lever. This counterweighted lever exerts sufficient friction so that no driving dog is necessary.

The pointer slide is set in the radial position by a size block which is pivoted to the slide. A spring keeps this block in the raised position where it clears the fixed "locating" stop on the main slide when "rolling" the involute.

This machine can, if desired, be equipped with an electrical recording device for automatically charting the involute profile. The machine also has an electric gage which can be used as a limit gage where a large number of gears are to be checked and where permanent records are not desired. Maximum capacity is 12-in. pitch diameter.

Wesson Universal Vise

A universal vise for use in connection with angular milling, grinding, and drilling operations has been announced



Close view showing setting of pointer slide in the radial position,

CUSHMAN CHUCKS

available in FULLY DEVELOPED SERIES for ALL FOUR TYPES

of SPINDLE NOSES



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nd ed Anticipating the trend toward standardization, Cushman Engineers have developed an increasingly broad range of Chuck types and sizes designed for use with the New Standard Spindle Noses. Further important improvements . . . in jaw design, in the construction of component parts and in the development of forged steel chuck bodies . . . combine with the advantages of the new type spindle noses to speed production while maintaining unusually high standards of precision and reducing work spoilage.



You are very cordially invited to consult the Cushman Engineering Department concerning your chuck problems incident to tooling up for increased production. Also, if you have not yet received a copy of the Cushman Catalog we will be glad to send you one on request.



LIGHT • MEDIUM • HEAVY DUTY
TWO-JAW • THREE-JAW • FOUR-JAW
INDEPENDENT • SELF-CENTERING
COMBINATION
COLLET CHUCKS and COLLETS

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AMERICAN STANDARD TYPE A-1
CAM LOCK TYPE D-1
LONG TAPER KEY DRIVE
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HARDENED STEEL BODY

POWER CHUCKS

POWER UNITS • POWER WRENCHES

THE CUSHMAN CHUCK COMPANY
HARTFORD, CONN.

A world standard for PRECISION

CHUCKING ENGINEERS Since 1862



Wesson Universal Vise

by the Wesson Company, 1050 Mt. Elliott Ave., Detroit, Mich. The vise is adjustable in three planes, and each plane is completely graduated. This construction is said to permit set-ups for complicated angle jobs in the minimum time.

A special feature of the Wesson Uni-

versal Vise is its accuracy and ability to handle heavy cuts. The vertical member is built like a cradle and rocks in a solid base. All-steel construction gives added strength and makes for light weight and convenient portability. The vise may be moved from one machine to another for successive operations without disturbing the angle. The unique design also provides large capacity with minimum overall size, permitting the vise to be used in close quarters.

The vise is manufactured in two sizes, it is a solid to the size of the

The vise is manufactured in two sizes, either of which may be furnished with a flat top plane and used as a universal angle plate. The vise may also be used as a gage in checking angles already produced.

Thor ½-In. "Drill Champion"
Electric Drill

A ½-in. capacity light-duty portable electric drill, to be known as the Thor Drill Champion, has been announced by the Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. The drill is designed for intermittent service. It is especially adaptable for auto-



This machine quickly stamps details and serial numbers into name plates.

Write for Particulars

GEO. T. SCHMIDT, Inc.



Thor 1/2-In. "Drill Champion" Electric Drill

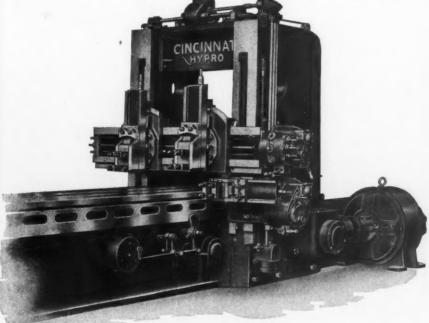
motive, electrical, plumbing, and similar installation and maintenance work, and can be used for drilling in both wood and metal.

The ½-in. Drill Champion weighs only 9½ lbs. and is but 15½ in. overall. In addition, it is streamlined so that it can be used effectively in hard - to - reach places. One of the outstanding features is a powerful motor and extra heavy tooth pitch gears for transmitting power to the chuck. It has an extra large air intake to keep the motor cool. Oil-lite bearings are used throughout, except on

WANT PLANER INFORMATION?

Cost and performance records make it plain that Cincinnati Hypro Planers increase operating efficiency, lower production costs, improve quality and minimize loss in time and materials. The smooth, even flow of power through the complete herringbone gear train to the table produces smooth finished parts. If you want the plain facts on Cincinnati Planers, write

If you want the **plain facts** on Cincinnati Planers, write for the illustrated catalog which gives complete details.



THE CINCINNATI PLANER CO. CINCINNATI

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er ir te on the spindle where ball bearings are used.

Standard equipment includes double pole momentary switch fully enclosed in a dust-proof compartment in the switch handle, a spade handle, and a removable dead handle. A handy spring clip retainer for the chuck key is provided. A three-jaw Jacobs chuck and three-conductor cable and plug are furnished.

"Air-Master" Air Purifying Attachment

The Air-Master, a new air purifier attachment for grinders and buffers, has been announced by The Cincinnati Electrical Tool Co., subsidiary of the R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. Constructed to fit all grinders and buffers, the Air-Master sucks dust and grit off the grinding wheels, filters the air through a series of filter bags, and returns the air fresh and pure.

Heavier particles fall immediately into a large tray in the bottom of the cabinet; a foot lever is provided for shaking the lighter ones from the filter bags into the tray, which is removable for easy cleaning. The unit is suitable



"Air-Master" Air Purifying Attachment

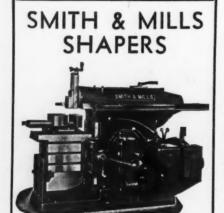
for use with all makes of grinders and buffers having exhaust outlets. It is regularly connected into the switch which controls the grinder or buffer and starts simultaneously with the machine.

The fully enclosed motor, suction fan, and filter bags are all completely enclosed in a compact lacquer finished, insulated cabinet, mounted on rubber feet, ensuring quiet operation. A metal partition prevents entrance of dust and grindings into the motor compartment.

The Air-Master is available in two sizes: for wheels up to 10 in., 1½-in. face; over 10 in. and up to 14 in., 3-in. face, furnished complete with breeching or piping from exhaust outlets on grinder or buffer hoods to dust collecting unit.

Robbins Non-Magnetic Sine Plate

The Robbins Engineering Company, 635 Mt. Elliott Ave., Detroit, Mich., has developed a non-magnetic sine plate to supplement the Magna-Sine line marketed by this firm. It is intended to be used only in inspection departments for



Automatic lubrication—forced feed. Multiple disc clutch and brake. Quick feed changes. Direct reading feed and stroke dials. Power rapid traverse to cross feeds.

THE SMITH & MILLS CO.



BATH TAPS CAN TAKE REPEATED RESHARPENING

... because their metal structure has been made correct and uniform from core to cutting edge by grinding from the solid *after* hardening.

This uniformity of metal structure permits repeated regrinding without loss of efficiency.

Next time order BATH Taps—they last longer and therefore cost less.

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Robbins Non-Magnetic Sine Plate

accurate checking of angular machining work.

The plate is built on the same principle as the Magna-Sine, and utilizes standard gage blocks for adjusting the plate to the required angle or combination of angles. It is available in the same sizes and is manufactured to the same precision limits as the Magna-Sine. Its construction throughout is of oil hardening steel. Both compound and single angle types are furnished.

The manufacturer claims that because this sine plate incorporates no magnetic coils, its cost is lower and it is more economical for inspection use than the magnetic type of Magna-Sine.

"Ridgid" Tri-Stand Vise

The line of "Ridgid" pipe tools manufactured by The Ridge Tool Company, Elyria, Ohio, has been augmented by the addition of a vise complete with

three-legged stand that offers many convenient features.

The legs of the Tri-Stand Vise are so constructed that they give perfect balance when set up and prevent topping. They are hinged at the tray, fold together compactly, and fasten with a chain for convenient handling and carrying. Legs equipped for screwing to planks or floors can be supplied if desired.

The tray is wide and roomy providing plenty of space for the dope pot, oil can, and tools. Tools can be hung on the raised rim as well as in slots provided in the tray. A pipe rest and three different size pipe benders that will not collapse the pipe are provided. The vise is equipped with a quickly



"Ridgid" Tri-Stand Vise

adjustable screw for a ceiling brace to hold the vise rigid while in use.

Ridgid Tri-Stand Vises are available in 2½-in. yoke and 4-in. chain patterns, made of special strong malleable metal, with jaws of highest quality tool steel,



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Janette SPEED REDUCERS

43 Sizes from 1/50 to 10 H.P. Speeds from .0083 to 1140 r.p.m.

The diversity of Janette motorized and motorless reducers enables you to select the style of compact, rugged speed reducer, to exactly meet your individual requirements. May we give you complete information.

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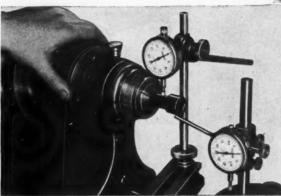
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FOR USERS OF PARKER-KALON SOCKET SCREWS



PRECISE CONTROL OF HEAD DIMENSIONS

Perfect seating of socket screws in counterbores is assured by this head-to-body concentricity test in Parker-Kalon's laboratory. Uniformly accurate head heights and diameters are guaranteed by other tests --- all to save you difficulties.

"16 POINT QUALITY-CONTROL" Leads Critical Buyers to Demand PARKER-KALON

Head Dimension Tests are only one part of the 16-check routine on important characteristics of Parker-Kalon Coldforged Socket Screws. In a laboratory without counterpart in the industry, quality is guarded by thorough tests and inspections covering:

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> 1-Chemical Analysis. 2-Tensile Strength. 3-Ductility. 4-Torsional Strength. 5-Ability to take Shock Loads under Tension. 6-Resistance to Shock Loads under Shear. 7-Hardness. In

addition, there is a rigid inspection of these essentials: 8-Head Diameter. 9-Head Height. 10-Concentricity of Head to Body. 11 - Socket Shape. 12 - Socket Size. 13-Socket Depth. 14-Centricality of Socket. 15-Class 3 Fit Threads. 16-Clean Starting Threads.

In this way Parker-Kalon maintains a new higher standard of quality in Socket Screws...a standard that satisfies the most critical buyer. Send for free samples....see for yourself.

PARKER-KALON CORP., 198M Varick Street, New York, N. Y.



- B. Exact Height
- C. Perfect Seating
- D. Perfect Concentricity



PARKER-KALON SOCKET SCREWS

scientifically hardened for firm grip and long wear. The yoke vises have No-Mar jaws that protect pipe surfaces.

"Ideal" Improved Industrial Cleaners

The line of portable hand-type and portable tank-type industrial cleaners manufactured by the Ideal Commutator Dresser Co., 1031 Park Ave., Sycamore, Ill., is now being furnished with new improvements which include a three-wire ground cable and protective mesh wire screening of motor commutator housing.

The three-wire cable, which is permanently attached to the blower handle, uses the third wire as a ground on the handle casing to protect the operator from shorting shocks caused by weather, excessive moisture, oil accumulation, and accidental contact with

"live" parts.

On the socket end of the three-wire cord is a novel arrangement which permits use of the ground wire without a special socket. The third or ground wire protrudes through the jacket of the socket attachment plug. On the end

of this ground wire is a screw which conforms to the thread size of the screws which hold wall socket boxes in place. The operator simply removes one of the wall socket box screws and replaces it with the ground wire screw. For additional convenience, this screw is separable. Part of the screw is turned into place in the wall box and the balance of the screw on the end of the



"Ideal" Improved Industrial Cleaner

live ground connection.

Another major improvement is provision of a fine mesh wire screen which covers the commutator end of the motor housing and prevents the entrance of excessive dust and dirt. The screen also acts as a protection should any minor explosion occur inside the housing due to the commutator sparking and igniting explosive dust, as it confines the explosion to the inside of the housing.

"Miccrolite"

The Michigan Chrome Company, 6346 E. Jefferson Ave., Detroit, Mich., has introduced a protective coating material to be used for insulating plating racks. This coating, to be known as "Miccrolite," can be applied and will air dry quickly. Under average drying conditions, one coat can be applied each hour. The seven coats recommended to prepare the racks for plating use can be applied in one day and the racks can be used the following morning.

This material has been developed as an all-purpose protective material for plating racks used in any solution or acid or in any process. It is not affected through the complete cycle of plating and is said to be effective in all types of cleaning operations. It contains no pigments and is perfectly clear in appearance both before and after applying.



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CHICAGO MOUNTED V/T SUPER BOND

Greatest Forward Step in 30 Years
V/T Super Bond is one of the most
important developments in mounted

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Chicago Mounted Wheels of V/T Super Bond have 150% to 300% longer life, according to tests in man yplants on snagging and exacting opera-

tions. Will not ridge on welds, sharp corners, sinking dies, barbering, etc. There's a shape and size to handle every grinding job faster, better, at lower cost. Let us send you a trial wheel. Tell us the kind of job, type of equipment used and size wheel you prefer. FREE MOUNTED WHEEL CHART—Ideal for ready reference in the shop. A Wall Chart 22 x 15" showing actual size and shape of every standard Chicago Mounted Wheel.

A small "power house" that can be used wherever there is an electric outlet. Grinds, drills, polishes, cuts, routs, carves, sands, saws, sharpens, engraves, cleans, etc. Uses 300 accessories. Weighs

12 oz., 25,000 r.p.m.
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Send for catalog of complete line.

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Worn Standards Result In Production Losses

CONSTANT STANDARDS
are ESSENTIAL

Use Dearborn Gage Company's Chrome Plated Gage Blocks to assure constant measurement.

Have your old gage blocks restored to their original accuracy with Chrome Plate.



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"Originators of Chromium Plated Gage Blocks"

22035 Beech Street
DEARBORN - MICHIGAN

Miccrolite is of a low viscosity which permits the application of extremely thin, yet effective, coatings. No thinner is required except for an occasional surface spraying when the racks are being dipped. It assures smooth, uniform coatings, and there is practically no dripping of the material after the racks have been dipped. Webbing or pocketing between contact points is reduced to a minimum.

This material can be applied either by

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Illustration showing a typical rack being dipped in Miccrolite.

hand or machine dipping. It is applied directly on the metal surface of the rack, with no treatment necessary other than cleaning the surface to be coated. No tape or any special treatment is required. If a rack should become damaged in process, it is only necessary to touch up the damaged section, the patch becoming an integral part of the coating.

"Michigan" Standard Cone-Drive Speed Reducers

A standard line of heavy duty speed reducers designed to incorporate Cone area-contact of worm gearing has been announced by Michigan Tool Company, 7171 E. McNichols Rd., Detroit, Mich. Capacity for capacity, the units are roughly two-thirds the size of standard worm gear reducers, with a propor-

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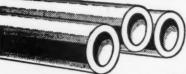
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Don't waste time and money in drilling from the solid . . . Order BISCO TOOL STEEL TUBING.

Prompt shipments from stock in sizes up to 14" diameter and 2" wall thickness. Other sizes to your specifications. Investigate and save!

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They are most satisfactory when used in WAL-THAM CYLIN-DRICAL SUB-PRESSES where accurate alignment is not only attained but maintained. We can furnish these Subpresses in nine diameters of plungers. The arch type is used for strip punching with or without roll feed. Use the overhang type for second operation work requiring hand positioning.

Waltham Machine Works

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MAGNETIC

Right—No. 618 Standard Type Rectangular Magnetic Chuck. Available in sizes 4 x 8 to 30 x 96.





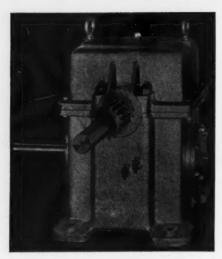
STANDARD ROTARY CHUCKS

Style D (right) for thin, small work, as well as for general grinding. Style B (left) is ideal for work of average size and thickness. Four standard styles, all interchangeable.

Ask for Circular W3.



O. S. WALKER COMPANY., INC.



"Michigan" Cone-Drive Speed Reducer

tionate saving also in weight. The savings are due to the fact that the larger area per tooth and greater number of teeth in contact with Cone worm gearing permits a material reduction in center distances for the same load capacity

In addition to the savings in weight and size, unusually high efficiencies and long life are claimed for the units. The latter is attributed to the fact that in Cone worm gearing, both worm and wheel tend to re-generate their true form in service. This, in turn, is due to the method of generation of the worms and wheels, using hobs and cutters of identical mating capacity which finish the tooth form while running on exact operating center distance in a manner similar to taking up of backlash.

Part of the high efficiency is said to be attributable to the lubrication characteristics of the gearing, the entering worm thread spreading oil on the contact surfaces instead of the oil being squeezed out. Also contributing is the elimination of the necessity for heattreatment after finish machining, thus avoiding heat-treat errors.

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Cone-drive speed reducers in the new standard line are all of the vertical worm-on-bottom type. They are designed for heavy duty service throughout, with rugged cast housings of high tensile Nickel Iron. The Cone worms are of Chrome-Molybdenum-Nickel steel with a tensile strength in excess of 150,000 lbs. per square inch. Nickel bronze with tensile strength in excess of 50,000 lbs. per square inch is used for the worm wheels.

Anti-friction bearings are used throughout except for the sleeve bearings on the gear shaft in the largest units. Roller bearings are used in the gear shafts in the smaller and intermediate sizes. Worm shafts are carried in ball thrust and roller radial bearings in the larger speed reducers. line comprises models ranging from 3 to 151/2-in. center distance, with a wide selection of standard ratios for each

Fisher Metallurgical Belt Grinder

The Fisher Metallurgical Belt Grinder described here has been brought out by Fisher Scientific Company, 717 Forbes St., Pittsburgh, Pa., for rough or fine grinding of metallurgical specimens or for other similar fine work. The instrument consists primarily of a grinding belt driven by a 1/4 h.p. motor, the whole mechanism enclosed in a compact housing in the top of which is an opening into which the workpieces



Complete stocks of all sizes from 1/8" to 21/2" available for

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2120 WALNUT STREET CHICAGO • ILLINOIS

146

are placed for grinding or polishing. The housing has a black and gray crackle finish with a chromium lifting handle and off-and-on switch. Motors are available for four types of grinding; for 110 volts, 60 cycle, A.C. or D.C., or for 220 volts, 60 cycle, A.C. or D.C.

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or for 220 volts, 60 cycle, A.C. or D.C. Fisher Grinding Belts for use with the grinder can be had in five grades of grit; very coarse, coarse, medium, fine, and very fine. The belts are 4 in. wide and are made with a 45 deg. seam of uniform thickness.

G-E Delayed-Action Mercury Switches

A line of delayed-action mercury switches, available both in circuit-opening and circuit-closing types, has been announced by the Lamp Department of General Electric Company, Hoboken, N. J. An addition to the standard line



G-E Delayed-Action Mercury Switch

of Kon-nec-tor mercury switches, the units may be obtained with time-delay intervals of from ½ to 15 seconds for circuit-opening, and from ½ to 10 seconds for circuit-closing.

The Kon-nec-tors are small, compact units of approximately the same size and external design as conventional mercury switches. Simply and economically mounted, they may be operated either mechanically by means of a lever or cam action, or electrically by means of a solenoid. The units have been designed with an electrical capacity ample for handling the average control circuit.

The delayed-action characteristic of the switch is obtained by the restricted flow of mercury through a small orifice at the bottom of a metal chamber inside the switch. When the Kon-nec-tor is tipped, mercury flows into the chamber, then through the orifice until the circuit is opened or closed, depending on the type of switch. The circuit is immediately restored when the switch is tipped back to normal position. Definite, non-adjustable time intervals are

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Hollow Set Screws with the Knurled Points

Accidents and breakdowns caused by ordinary set screws working loose just can't happen when your machines are equipped with "Unbrako" Self-Lockers. Once set up they stay absolutely tight...not a chance for them to vibrate loose which means far less maintenance work in the bargain. These screws can easily be set up or removed



Fig. 1645 Pat's. Pend'g.

with the ordinary hex bar wrench and re-used indefinitely, always with the same effectiveness. Write us today for samples, prices and details.

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA.

Boston Detroit Indianapolis

BOX 556

Chicago St. Louis San Francisco built into the individual switches by varying the amount of mercury and the size of the orifice.

Like the standard Kon-nec-tor switches, these delayed-action switches are hermetically sealed in glass. As a result, they are ideally adapted to use in moist or corrosive atmospheres. Because there are no external metal contacts subject to wear or corrosion, the units can be operated literally millions of times with unvarying efficiency and accuracy.

"Esco" Drawing Stand

A new addition to the line of "Esco" drafting specialties made by Engineering Sales Company, Sheboygan, Wis, is a drawing stand developed principally to meet a demand for an efficient, yet inexpensive, small drawing unit for offices, drafting rooms, and home use by engineers, architects, and designers generally.

The complete unit is carefully designed and sturdily constructed and includes a quality drawing board top with straightedge and built-in parallel ruling

device. It is available in three sizes of drawing board tops — 21×26 in., 25×31 in., or 24×37 in. — and is adjustable both for height and incline of drawing surface.

No tools are required for assembly,



Esco Drawing Stand

all parts are secured by wing nuts, and only two minutes are required to set up the stand.

Carboloy Develops Extrusion Process for Producing Cemented Carbide

Carboloy cemented carbide now can be produced in the form of tubing, spirals, and round or shaped bars by means of an extrusion process, according to an announcement by Carboloy Company, Inc., 11143 E. Eight-Mile Rd., Detroit, Michigan.

Available in lengths up to 20 in. and within a diameter range of from 0.015 to % in. O. D., these rods, spirals and tubes are considered a distinct innovation compared to previous practice. Formerly such parts were available only within an extremely limited size range and it was necessary to perform a large part of the shaping operation manually. With the new process now employed, the Carboloy parts are formed directly into the shapes desired, eliminating



izes in., Quicker assembly . . . adof Lower cost with oly.

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KEYS



· Whitney keys are easily fitted - because they're accurately made. That means time-saving, money-saving assembly of shaft and keyed member. Yet Whitney keys reach deep in the shaft, stand greater strain, can't roll over. Write for Catalog

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How's Your Stock of Diamond Dressers?



NEXT TIME YOU ORDER-TRY DIAMOND-IMPREGNATED CARBOLOY GRINDING WHEEL DRESSERS

Unlike ordinary dressers, this dresser stands abuse, never requires remountings. Eliminates diamond loss and waste. Cutting surface removed in 10 seconds whenever needed. Use for rough, semi-finish and finish dressing. HOW TO ORDER

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| Grinding Whee| | Correct | Digmeter | Wright | Up to 20" | Up to 8" | 4-D | 15.35

CARBOLOY CO., INC. 11143 E. 8 Mile Rd., Detroit, Mich

· CARBOLOY · DIAMOND IMPREGNATED WHEEL DRESSERS

Cut Costs—Increase Profits—Use "L-W" Products 4-JAW INDEPENDENT LATHE CHUCKS

L-W Lathe Chucks are built with Now Made In semi-steel construction and heavily semi-steel construction and heavily ribbed body to withstand unusual strains. Four independent jaws made of accurately ground and fitted hardened steel are reversible and have 1½" tough nickel steel screws. Best material and workmanship guarantee satisfactory service.

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	10"					\$27.00
	12"					
	14"					36.00
	16"					45.00
	18"					58.50





.-W also manufactures Magnetic Chucks, Demagnetizers, Dividing Heads and Power Hack Saws. SWIVEL MILLING MACHINE VISES

Large, Semi-Steel, 85 lbs. Made in Two Sizes This large semi-steel vise which can be used This large semi-steel vise which can be used plain or swivel is suitable for milling machine, drill press or shaper. Has sturdy 6½" H steel jaws; key slots provide for attaching to machine table holding surface and jaws at right angles or parallel to table. Shipping weight 90 pounds.

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Send for a catalog of the complete L-W Line.

L-W CHUCK COMPANY

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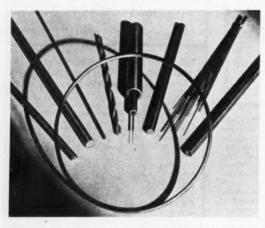
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most of the customary hand forming operations.

To those familiar with the limitations ordinarily encountered in working cemented carbides, the Carboloy tubing



Carboloy Tubes, Spirals, and Bars produced by a Newly-Developed Extrusion Process which widens the range of shapes and sizes.

now produced is of especial interest. It can be made as small as 0.060 in outside diameter by 0.030 in. inside diameter, leaving a wall thickness of 0.015 in. Particularly interesting is a supplementary process by means of which Carboloy rods can be bent to various shapes. The 5-in. diameter ring illustrated was produced through this process. It consists of a round rod curved to form a ring, with the ends joined together.

These two processes, making available a range of shapes and sizes heretofore considered economically or mechanically impractical, will undoubtedly tend to uncover numerous fields of application heretofore not regarded within the realm of practical carbide use.

Although the processes have by no means reached the stage of maximum utilization, and in some phases are still considered in the processes of development, many Carboloy products such as core bushings for ceramic dies, wire guides, valve needles, triangular glass drills, textile guides, and so on, are now being produced by these methods.

It is expected that these new sizes and shapes, when employed as wear-resistant parts, may offer a solution to numerous problems of abrasion and corrosion on machine parts subject to excessive wear. Carbide inserts, in small sizes, are already being employed for such purposes on business machines, spray guns, homogenizing valves, bread slicing machines, rayon machines, oil well pumps, refrigerating equipment, and so on. The new sizes and shapes indicate

even broader application in the wearresistant field in the future.

The new method which has been developed makes possible the production, by the extrusion or molding process of Carboloy which is as good in every respect as that made by the standard cold press or hot press methods. This has been proved by hundreds of comparative tests of strength, density, hardness and porosity.



For Engine Lathes
SIZES FROM 1/4 TO 2 H.P.
WRITE FOR DETAILS

THE SAROSTON CO. 251 PARK ST., UPPER MONTCLAIR, N.J.

"Alligator" V-Belt Fasteners

The V-belt fastener announced two years ago under the trade name of "Alligator" by the Flexible Steel Lacing Co., 4607 Lexington St., Chicago, Ill., has been brought out for "B," "C," and "D" section V-belts. The use of the fastener, however, is limited to the crosswoven fabric core V-belts that are now being built by some of the V-belt manufacturers and should not be applied to cord belts.

It is said that the Alligator V-Belt Fasteners considerably broaden the field of application for V-belt drives. With these fasteners it is possible to install and maintain matched lengths of

ARMSTRÈNG BROS.



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Solve your tough machining problems with the right ARMSTRONG **TOOL HOLDERS**

Tough alloy steels and stepped up schedules create no machining problems for the shop that has the right ARMSTRONG Tool Holders for each job. Comprising over 100 sizes and shapes (tool holders for every operation on lathes, planers, slotters and shapers) the Armstrong System provides strong, correctly designed, and efficient tools that will stand up to any load the machine tool can pull. Included in the system are new Spring Cutting-Off Tools, Spring Threading Tools, and "Carbide" Tool Holders that simplify the machining of the hardest and toughest steels.



ARMSTRONG BROS. TOOL CO. "The Tool Holder People"

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Specify CIRCLE "R" Saws







CIRCLE "R" Saws are made in both high speed and carbon steel, from 1/4" to 10" diameter. Prompt delivery on all standard orspecialsaws. Writeforcatalog.

CIRCULAR TOOL CO., Inc.



Universal Chucks Make a Straight-Shank Drill the Equivalent of a Taper Shank

It's a fine, powerful little piece of machinery - this Universal Collet Chuck. It gives a positive grip (as strong as solid steel) on the flutes or shank of any drill. It has a wrench grip, an automatic release spring, plenty of allowance for tool feed-out, and ground threads that assure concentricity. Write for free collet chuck catalog.



Engineering Company Frankenmuth, Mich. V-belts on multiple drives without the necessity of tearing down expensive installations. It will also be possible to make up a wide variety of multiple V-belt drives right from stock coils of belting.

The fastener consists of two die formed steel end plates, two bushings, two two-piece rocker pins, and special nails. The end plates are held onto the ends of the belt by specially formed flat nails. The nails enter the belt with their flat side parallel to the belt length, leaving the burden-bearing fibres intact and without materially bulging the

sides. These die-formed end plates are narrower than the belt so that no metal comes in contact with the sheaves.

Each half of a fastener has its bushing and its rocker pin, and the two halves are joined by flat links. When assembling or disassembling a fastener, a simple rocker pin tool is used that



"Alligator" V-Belt Fastener

GRAY TURRET HEAD
METAL CUTTER OR NIBBLER
Cuts all metals any shape—
30 gauge up to 1.

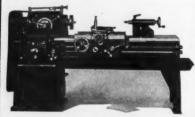
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GRAY, Originator of First Practical Metal Cutter or Nibbler. GRAY Cutters Still Lead.

GRAY MACHINE CO. Dept. A P. O. Box 596 Philadelphia, Pa. engages in T-shaped slots at the end of the rocker pin. When the rocker pin is turned as it is assembled, it clicks into position and cannot come out while the belt is in service.

The use of two rocker pins with the connecting links materially reduces the bend of the belt behind the end plate as the fastener passes around the sheave. Hence it is said that this double hinge construction increases the belt life as continual excessive bending of the belt at any point will eventually rupture the fabric, causing failure. Friction wear is also reduced to the absolute minimum, as there is no sliding movement of either end plates, bushings or links. As the fastener passes around the sheave, the only internal movement is at the knife edge of the rocker pins.

New "C & J" 15" and 16" Lathes



12 Speed Geared Head-Motor Drive Timken mounted spindle Modern Design—Liberal Dimensions Write for bullstin.

The Carroll & Jamieson Machine Tool Co.
BATAVIA • OHIO, U. S. A.

Superseal Connectors

The illustration shows a few of the connectors made by the Superseal Corporation, 300 Fourth Ave., New York, N. Y., for use with aluminum, brass, copper and steel tubing, and so on. The connectors are available in sizes from ½ to 2 in. in various adaptations and in a wide range of lengths.

The particular effectiveness of this type of connector is due to the distinctive design of the Superseal Couplings, employing the exclusive compression joint, sealed both inside and outside with the ends of the tubing flared to a 20 deg. angle. This provides a long flare which makes certain a tight seal with the tubing wedged between the self-aligning compression nut and the fitting. The cut-away view clearly shows

GWILLIAM THRUST BEARINGS

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Type CC—Designed to Take Combined THRUST and LIGHT RADIAL LOADS

 Especially adapted for slow speed and heavy thrust duty, such as marine rudder posts and similar installations. To order only - any quantity.

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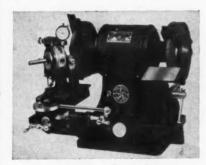
VIMCOLIGHT contributes to the accurate work produced by this K. O. Lee Reamerand Cutter Grinder.





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TRIM YOUR DRILL COSTS



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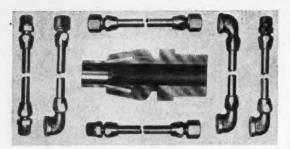
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Produces perfect points on drills No. 41 to 5/8" inc.

Write for Descriptive Folder.

STAR MACHINE & ENGINEERING CORP.

Division STAR ELECTRIC MOTOR CO., Bloomfield, N. J.



Superseal Connectors

this long flare. Leaks or breaks are said to be impossible.

The sealed flare can be loosened and tightened any number of times without injury to the tubing. Another Superseal feature is the full inside diameter of both tubing and fittings. Actually, each Superseal Fitting is a union in itself as shown in the sectional view of the connector.

Many manufacturers of equipment have found the Superseal invaluable due to the fact that it makes an absolutely tight joint, saves in the number of fittings required, and tools required in connecting, and offers considerable flexibility in the make-up of the line.

Cunningham Inspector's Hammer

The M. E. Cunningham Company, 158 E. Carson St., Pittsburgh, Pa., has developed an inspector's ham mer for marking metals, timber, and other hard materials. The hammer has

numerous industrial applications, such as in the stamping of castings, shafts, pipe, and so on. In addition, it is a valuable tool for boiler, bridge, and rail-

road inspectors.

Available in four standard sizes of 3/4, 11/4, 11/2, and 2 lbs., the hammer is made of Super Cesco Safety Steel. Immunity from mushrooming and spalling is one of the outstanding qualities of tools made from this steel, and it is said to stand up over longer periods of use than other steels. Interchangeable plugs of this same material are



AUTOMATICALLY SHARPENS METAL SAWS IN GANGS

Up to 51/2" diameter and up to 13/2" thickness. 100 SAWS of 26 GAUGE CAN BE SHARPENED AT ONE TIME.

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Whole, unbroken diamonds of high quality and extreme toughness are spaced regularly throughout the matrix to give great accuracy, uni-form dressings and to hold wheel to size. These stones are anchored permanently in their matrix by strong chemical bonds that will not hreak under heat, pressure or rough abuse. No remounting! Lowered costs! After tool is put in machine it will give best results if left in original position. It is not necessary to turn or alter the area in contact with the grinding wheel.

Send for literature and prices.

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Designed to save labor and floor space . . . to protect tools against pilferage, loss, damage and fire. Lyon Steel Tool Storage Equipment is built to last a lifetime. No matter how complex your tool storage problem, it can be solved with some economical combination of Lyon's complete line of adjustable units. Shelves and dividers are completely flexible . . . are easily rearranged to meet increasing or changing tool storage needs.

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fitted on either end of the hammer and are held securely in place by special spring pins, making it possible to have



Cunningham Inspector's Hammer

a company insignia on one end and a chisel or prick edge on the other, the latter for determining blowholes in castings, and so on. Special inserts can be made for any desired trademarks or symbols.

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Styles 7 x 17 and 6 x 13



Developed to meet demand for chucks lower than our standard style.

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J. & H. ELECTRIC CO. 202 Richmond St. Providence, R. I.

Stackbin Steel Tote Tray

An inexpensive steel tote tray to hold finished or semi-finished machined parts without scratching or marring them has been announced by Stackbin Corporation, 46 Troy St., Providence, R. I. Of heavy steel construction, with all edges rounded to eliminate the possibility of scratching, these tote trays offer an efficient solution to the problem of handling accurately machined parts whose finish might be marred by contact with each other.

Finished parts can be taken from machines, stored in these stacking trays, and carried in them between operations and from one department to another. Thus, the trays are said to save many handling operations and completely eliminate all danger of damage from

contact with each other.

Because they are made entirely of steel, the trays can be used for dipping and draining parts, saving time and protecting the parts against damage



Stackbin Steel Tote Trav

during handling. The travs are designed for stacking, eliminating the danger of their contents touching each other or of tipping over. They are available with either pegs or holes, as needed, and can be furnished with removable wooden boards if desired.

Markwell Stencil Holder

To the line of "Markwell" stenciling tools made by Pittsburgh Stencil & Tool Co., 405 Penn Ave., Pittsburgh, Pa., has been added the stencil holder shown in o hold parts m has rpora-I. Of edges ty of n effihandwhose with marays, tions ther. many etely from

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> The price of a new tap is nothing, compared to the cost of removing the broken one by any other method. WALTON BACKS it out; saves the thread (and your time.)

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Small Tools.

Long Length Drills Special Size Taps Carried in Stock

High speed and carbon drills, taps, reamers, milling cutters, hollow mills, end mills, drill rod, die sets, etc. .

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VICTOR MACHINERY EXCH

(INCORPORATED)

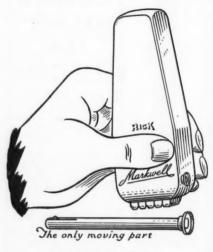
NEW YORK CITY

251 CENTER ST.

the illustration. The feature of this holder is an ingenious self-contained locking pin by which the type are held in place, eliminating the use of springs, clips, and other devices.

The pin is the only moving part, but locks the type securely in place. One quick motion locks the type; another unlocks it. It is said that the type can not loosen up in use.

Another feature is the thin tempered anvil which is held in place against the chrome nickel steel body without the use of rivets or screws. The anvil is said to become tighter as it is used. The stencil holder is strong enough for marking steel billets and light enough for numbering tools and similar parts.



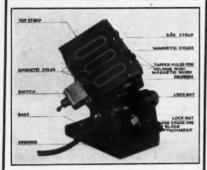
Markwell Stencil Holder

The holder is made for characters from $\frac{1}{16}$ -in. size to $\frac{3}{4}$ -in. and can be supplied for larger sizes.

"Modern Collet" Feed Handle

The Modern Collet and Machine Company, 401 Salliotte St., Ecorse, Mich., has introduced a new type of feed handle for use on Gridley Automatic Screw Machines. The feed handle is so adjusted that, in the meshing of the gears and feed box, the gears will positively stay meshed. This eliminates all

MIDGET Compound Angle MAGNETIC CHUCKS



Also Angle Plate Magnetic Chucks ground square. Magnetic Parallels. 5" Sine Bar Parallels. Write for circular.

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To get real production from your grinding wheels, they need to be dressed and trued regularly.

Use the **New Improved** Vincent Huntington dresser equipped with **Milled** cutters of **high-carbon** tool steel, and you can be assured the job will be well done. Call your nearest Mill Supplies distributor. Insist on the dressers with the aluminum finish.

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No. 455 Angle Iron Combination

Shears, Notches and Bends a 2" x 2" x 1/4" angle iron in one minute flat.

Write for catalog on entire line.

No. 20 BALL BEARING PUNCH

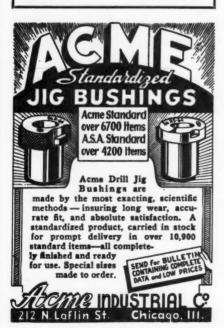
Capacity 1/2" thru 1/2" iron.

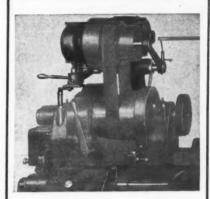


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Three Speed Drives are furnished on the screw machines and variable speed can be furnished on Punch Presses.

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1806 S. Kilbourne Ave. Chicago, III. rattle and unnecessary wear on the feed box gears as well as on the feed box speed change holes.

In designing this feed handle, provisions were made to not only make it as durable as possible but also to simplify the construction to the point that any repair costs necessary during the life of the handle would be almost neg-



"Modern Collet" Feed Handle

ligible. In the "Modern Collet" Feed Handle the parts are so constructed and arranged that any individual part may be replaced quickly and easily.

Cincinnati 9½-In. Quill Hypro Planer Type Milling Machine

A Cincinnati Hypro Planer Type Milling Machine 60 in. x 48 in. x 14 ft. in size and with 91/2-in. quill has been brought out by The Cincinnati Planer Co., Cincinnati, Ohio. Of the usual "Cinc'nnati" modern type of construction, the design includes all of the features that have been developed by this firm in recent months. Housings are of massive pyramid construction rigidly reinforced inside with thick vertical and horizontal walls. Housings are anchored to the bed with wide tongues and grooves, and dowels and bolts of large

The bed is slightly more than twice

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feed box proe it imhat the eg-

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AUTO MOULDING & MFG. CO.

2326 S. CANAL ST. CHICAGO WRITE FOR STOCK LIST

Vitalized Air Power cuts production costs NORGREN

Wherever air is used in your plant, Norgren Vitalizer Units will cut lubrication and repair costs 75%. They clean the air—lubricate it automatically — increasing the efficiency of all air driven tools. We'll prove it to you, without obligation.

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HIGH PRESSURE

Air from cylinder through by-pass in cylinder head enters this slot on its way to the sutlet above. He opening in curved inner surface of cylinder means quiet operation.

iron pipe.

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We composition tips to require renewel frequently. Wing kept in censtant contact with cylinder by centrifugal force.

Ving and cylinder surface become hard and glossy-like, incuring a perfect fit and positive pressure or vacuum.

Big air space resulting from small pisten and curved wings.

LEIMAN BROS. PATENTED OUTLET threaded for iron pipe.

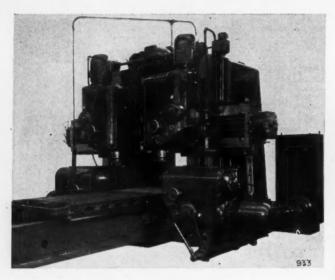
Enclosed stud in piston holds wing close to cylinder at tep, preventing loss of air pressure or vacuum.
Air coming in at inlet at side comes through this slet into cylinder head by peas and thence into the cylinder head to cylinder head of cylinder means quist of cylinder means quist of cylinder means quist operation.

The easy-action hings enables wing to open and close, thus becoming wear-apensating by the action centrifugal force.

BLOWERS AND VACUUM PUMPS **GAS BOOSTERS** AIR MOTORS

Gas Furnaces -- Blow Pipes -- Oil Burners --Gas Machines -- Atomizing --Agitating -- Vacuum Printing Frames -- Paper Feeding --Bottle Filling -- All Automatic Devices.

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Cincinnati 9½-In. Quill Hypro Planer Type Milling Machine

the table length, preventing overhang of the table. The bed is enclosed and the table drive section through the center is of increased depth and especially reinforced to provide additional strength and rigidity at this important point. The all herringbone gear drive for the table is completely enclosed inside the bed. The herringbone gears provide for a smooth straight-line flow of power to the table under heaviest cuts. Herringbone design eliminates side thrust pressure and the gears are perfectly balanced. Gears are of steel and pinions are of heat treated chrome nickel.

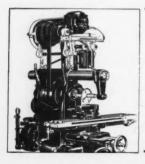
Milling heads are completely self-contained units, each powered by an individual 20 h.p. motor and lubricated by

an individual pump. Each head has eight spindle speeds, obtained by revolving a single cam with a dial to indicate the various speeds. All heads are automatically fed or power traversed independent of each other. Gears in the spindle driving mechanism are shaved, assuring quiet, accurate operation. All shafts rotate in anti-fric-

tion bearings lubricated by the pump in each head. Safety devices preclude possibility of mechanical damage to heads.

Inner guide bearings on the table and close-fitting hold-down clamps absorb all side thrusts and lifting pressure exerted on the cutters during milling operations. A convenient clamping device mounted on the bed, provides for locking the table in position for cross milling without exerting side or down pressure on the table or changing the oll film between the bed and table Vees.

A narrow guide horizontal bearing on the rail prevents binding of the head saddle during cross travel. Saddles are suspended on the rails by anti-friction rollers bearing on a hardened and



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SAVAGE NIBBLING MACHINES **Powerful Direct-Over-Genter Drive Totally Enclosed Revolving Head**

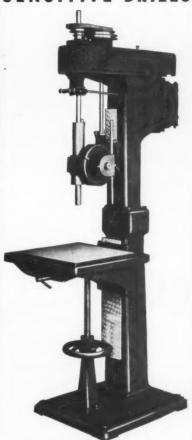


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Production Machine Co. GREENFIELD. MASS.

POLISHING MACHINES

ground inlaid steel strip running the full length of the rail. The rail on the larger size machine is electrically clamped to the housings, clamp pressure being equalized on a two-point bearing contact with the housings. An interlock between the rail clamp and rail elevating devices makes it impossible to damage either system by attempting to raise or lower the rail while locked.

Feed and power traverse mechanisms are controlled from a central pendant station which can be swung to any position on either side of the machine. There are 12 cross and down feeds for each head and a range of 12 feeds to the table for feeding in either direction. Table and heads can be fed or power traversed independently of each other, making it possible to adjust heads while others are operating.

This machine is also available with a smaller milling head and equipped with a 10 h.p. motor.

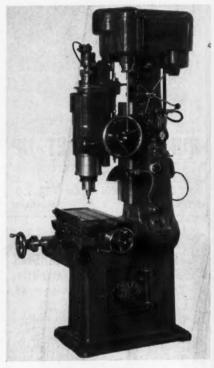
Moore Jig Grinder

A jig grinder, so called because of its similarity in principle to the jig borer, is now being marketed by Marburg Brothers, Inc., 90-96 West St., New

Burke motor driven miling machines, Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

Write for complete information,

York, N. Y. The machine, which was designed by Moore Special Tool Company, Inc., is intended primarily to correct the location of holes in hardened steel parts, jigs, master plates, gage parts, and so on. With this machine holes in hardened steel can be secured within limits, both as to size and loca-



Moore Jig Grinder

tion, which heretofore have been practically impossible.

The base and compound table of the jig grinder are of the same type of design as the jig borer, excepting that all table ways and slides are protected from emery dust by removable guards. The spindle head is mounted in double V-ways upon the column, the motor and variable speed drive for both feeds and speeds being located in the top housing. An infinite speed control covers a speed range of from 50 to 150 r.p.m. and the infinite feed control covers a feed range of from 0.004 to 0.020 in. per revolution

KE MACHINE TOOL CO

CONNEAUT, OHIO

was comcorened gage hine ured oca-Spindles Head rivets from smallest to 3/16" diameter. Built with automatic trip or foot operation. Other types include Double-Spindle Horizontal and Single-Spindle Vertical Noiseless Rivet Spinning Machines, and Single-Spindle Vertical Ham-WRITE mer type Riv-FOLDER

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because they stack compactly to form units of exactly the right shape and capacity:

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by keeping parts instantly accessible - by eliminating waste hand motions;

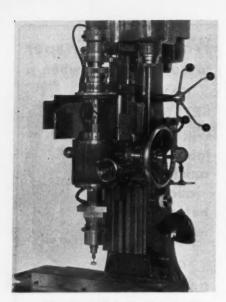
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by making orderfilling or assembly work faster, easier, more efficient.



See how you can save all three with patented STACKBINS-write to Stackbin Corp., 53 Troy St., Providence, R. I., for complete information.

> STACKBINS "STACKED AND STILL ACCESSIBLE"



Close View Showing Operating Mechanism of Moore Jig Grinder

of the spindle.

The main spindle consists of a large sleeve mounted on two preloaded 61/2-in. diameter precision ball bearings. Inside the sleeve is mounted the vertical slide carefully fitted into slide ways which are pivoted at the bottom so as to allow the vertical slide to swing from the vertical to a maximum of 11/2 deg. in either direction. Thus tapered holes can readily be ground up to a length of travel of 3% in. The grinding head is mounted on a cross slide which is carried on the lower end of the vertical slide. The cross slide permits manual

adjustment of the head up to 1 in. while the spindle is stationary. The cross slide itself can be adjusted to a limit of 0.100 in. while the spindle is in motion, the latter adjustment being accomplished by turning a large knurled dial mounted in an opening near the top of the spindle head unit. The dial is graduated with 100 lines spaced about ½ in. apart, each graduation representing 0.001 in. move-

ment of the cross slide.

The three special grinding heads which can be attached to the cross slide provide a total range of grinding wheel speeds of from 15,000 to 80,000 r.p.m. Both air and electrical equipment are available, the air and electrical connections, which are near the top of the spindle, being carried all the way down inside the spindle unit so that either system may be used as preferred. Thus all working parts are well protected from emery dust. The vertical slide can be engaged or disengaged by tripping a lever. The grinding range covers holes as small as 0.090 in. diameter (and less) up to 4 in. when 1-in. wheels are used.

All working parts comprising the spindle head unit, such as the upper spindle, universal joint, vertical slide and ways, lower cross slide, and adjustment control parts, are hardened, ground, and lapped, providing for the closest possible fit and eliminating ap-

preciable wear.

Table movement is 91/4 x 141/4 in. Table surface, 10 x 16 in. Maximum distance. table to wheel, adjustable to 8 inches.

Guyer Gauger

The Guyer Gauger which has been placed on the market by Streeter-Amet Company, 4101 Ravenswood Ave., Chicago, Ill., is a mechanical micrometer designed to produce a fast, simple, and

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8 years continuous use proved its value.

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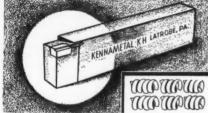
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Quick Set Ma-One wheel can NEW chine. be turned quickly by knurled knob for consecutive numbering.

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KENNAMETAL (The Steel-Cutting Carbide) Unequalled in the machining of forgings, bar stock or castings of carbon, alloy or stainless steels, also Monel metal and malleable iron • Cuts two to six times faster than high speed steel • Requires less down time for re-grinding and re-setting tools • Roughs and finishes in one cut • Takes interrupted cuts without breakage • Machines unannealed stock heat-treated up to 550 Brinell.

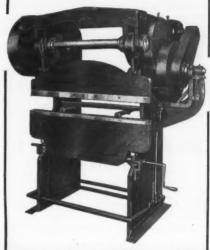
Your profit is made at the point of a tool. Speed up production of your lathe and boring mills, insist on KENNAMETAL-tipped tools. Write for complete

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CHICAGO STEEL PRESS

No. 253



does 40% to 60% of the forming work turned out by the average shop.

Here's a profitable, economical brake dealy adapted for rapidly forming metal sections such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes, and a great variety of sheet metal specialties. Its variable speed drive operates from 17 to 50 strokes per minute. The No. 253 CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials.

Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

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DREIS & KRUMP MFG. Company

7418 LOOMIS BLVD. CHICAGO

accurate means of checking the thickness or gauge of metal sheets.

In operation, the device clamps a sheet at any point where the thickness is to be measured. The work is held at this point long enough for the operator to read the large, legible dial. It is then automatically released for removal from the machine or to the next point to be measured. The cycle of clamping, gauging, and releasing is constantly repeated. The cycle frequency is under the control of the operator. By following the rhythm of the cycle, the operator can shift the sheet from point to point

rapidly, obtaining readings in a fraction of the time required for hand "miking." The standard machine will indicate from 8 to 38 gauge readings per minute, or any of the following reading ranges can be supplied, if specified: 9-42; 10-47; 11-50 per minute. The throat of the machine is 23 in. deep clear of

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Guyer Gauger

GEARS
Good Gears Only
All Kinds
Any Quantity
AT THE BIGHT PRICE
THE CINCINNATION GEAR CO.

1825 Reading Read

Cincinnati, Ohio

AND STO SINDER IN ART FIRST

the measuring anvil which admits great latitude in exploring wide sheets for uniform thickness.

The mounting of the gauging mechanism assures accuracy. The dial and measuring mechanism is carried by the two side members so mounted as to eliminate all errors due to deflection. The dial is graduated in 0.001 in. increments so that any desired gauge or tolerance may be readily established by means of adjustable dial rim markers. The dial tolerances represent the accuracy requirements of metal forming, drawing, and stamping operations.

A table which facilitates the handling



of sheets and supports the machine is furnished when specified. The table leaves are of clear, hard maple, hinged to the machine support, and shaped to provide easy handling of sheets with minimum sliding friction.

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The Guyer Gauger is a rugged precision device and has been subjected to exhaustive tests in both the laboratory and field. It provides an economical means for steel warehouses to sort and classify material to exact gauges.

Motor Drives for Drilling Attachments for B. & S. Automatic Screw Machines

Brown & Sharpe Mfg. Co., Providence, R. I., has brought out three types of motor drives, designed to drive cross drilling attachments and turret drilling attachments on B. & S. automatic screw

The drive shown in Fig. 1 is designed to drive drill spindle assemblies of the cross drilling attachments on the B. & S. Nos. 00G, 0G and 2G high speed automatic screw machines. The motor is attached by a bracket to the rear of



Fig. 1-Motor Drive for Cross Drilling Attachments

the machine bed and drives a pair of bevel gears in a case on the end of the bracket through a flexible coupling and connecting shaft. From the gears the drive is transmitted to the drill spindle through another shaft assembly, as shown. The mechanism in no way limits the movement of the cross slide or the position of the attachment spindle with

FOR THE ADJUSTMENT TURN THIS RING

A BETTER BOLT DIE STO

FOR BETTER BOLT THREADING.

Owners report die life increased ten to twelve times with a "TOLEDO" No. 101. Easier cutting. Better threads. There is a reason. "TOLEDO" No. 101 1/4" to 5/8" and No. 102 SEND WEOLED WATORD 1/2" to I" are the finest adjustable bolt die stocks made. Use the coupon. Get complete information on these remarkable new tools.

THE TOLEDO PIPE THREADING MACHINE CO. . Toledo, O. New York Office, 72 Lafayette St.



Fig. 2-Motor Drive for Turret Drilling Attachments

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relation to the cross slide. Drill speed is 4950 r.p.m. for all sizes of machines. Motors are $\frac{1}{4}$ h.p. for No. 00G and $\frac{1}{2}$ h.p. for Nos. 0G and 2G machines.

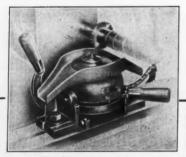
The drive shown in Fig. 2, for use on B. & S. Nos. 00G, 0G and 2G high speed automatic screw and turret forming machines, includes everything necessary to drive by motor the drill spindle assemblies of the turret drilling attachments. The motor is mounted on a bracket attached to the rear of the machine bed and is connected by a flexible coupling to a keyed driving shaft.

The mechanism in no way limits the indexing of the turret or the movement of the turret slide.

Drill speeds are 4550 r.p.m. for the No. 00G, 4050 r.p.m. for the No. 0G, and 4360 r.p.m. for the No. 2G machines. Since the drill rotates opposite the work,

the cutting speed of the drill equals the drill speed plus the work speed. Motors are ¼ h.p. for the No. 00G and ½ h.p. for the Nos. 0G and 2G machines.

In Fig. 3 is shown the motor drive for the cross drilling and turret drilling attachments for B. & S. Nos. 00G, 0G and 2G high speed automatic screw machines. Drill spindle assemblies of both the cross drilling and turret drilling attachments can be driven by the same motor with this equipment, which is essentially a combination of the in-



DEARBORN Automatic Chucking and Indexing Fixture MILLS OVER 1000 PARTS PER HOUR

Work held by draw in collets. Collets open and close automatically. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces. Minimum set-up time required. Speeds up production. Positive and accurate in operation.

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CENTERLESS GRINDING

Accuracy-Prompt Service

Gommercial Centerless Grinding Co.

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dividual motor drives for the cross drilling and turret drilling attachments.

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The motor is attached to the rear of the machine bed by a bracket and power is transmitted through a driving shaft and bevel gears to the respective drill spindles. Turret and cross slide movements are not limited. Turret drill speeds are 4550 r.p.m. for No. 00G, 4050

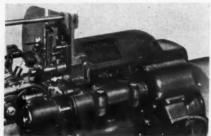


Fig. 3-Motor Drive for Cross Drilling and Turret Drilling Attachments

r.p.m. for No. 0G, and 4360 r.p.m. for No. 2G machines. Cross drill speed for all sizes of machines is 4950 r.p.m. Motors are $\frac{1}{12}$ h.p. for No. 00G and $\frac{1}{12}$ h.p. for Nos. 0G and 2 G machines.

Longitudinal Turning Attachment for B. & S. Automatic Screw Machine

For use on Brown & Sharpe Nos. 00 and 00G automatic screw, turret forming, cutting off, and high speed screw threading machines, Brown & Sharpe Mfg. Co., Providence, R. I., has brought out the longitudinal turning attachment This attachment illustrated herewith. is essentially a vertical slide attachment provided with longitudinal move-In addition to performing any vertical slide operation, it will also do straight turning to 1 in. in length. For turning behind a shoulder, it eliminates the need of a swing tool. The turning is accomplished independent of other operations and with the spindle running in either direction, and since the attachment is of sturdy construction and rigidly mounted, comparatively rigid turning is permissible.

The vertical and longitudinal move-



Sturdy, Fast, Accurate

Machine finish your punches. Eliminate the slow, tedious hand method.

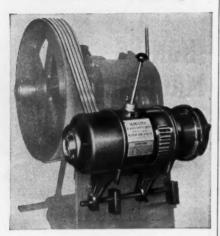
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ALL-HELICAL GEARED 4 SPEED SCHULTES UNIT

Instant Reversibility



Features:

For punch presses, lathes, shapers, milling machines, drill presses, etc. One lever syncromesh shift controls 4 speeds.

Instant reversibility with all 4 speeds. Adapted to V-belt, flat-belt, chain or direct drive.

Hand wheel permits rotation of machine spindle for set-up work with complete safety.

Cradle adjustment permits the unit to be revolved to any desired position... placing gear shift lever where most convenient.

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430 BELLEVUE AVE. DETROIT, MICH.

ments are both actuated by cams on the camshaft of the machine, each cam moving a ball crank, link and rack. The vertical movement rack turns a shaft which operates a pinion and rack in the tool slide to produce vertical movements of the slide and the other rack mechanism imparts longitudinal movement to a sleeve on the vertical movement shaft and thus to the tool slide assembly which is attached to the end



Longitudinal Turning Attachment for B. & S. Automatic Screw Machine

of the sleeve. Springs keep rollers on both bell cranks in contact with the cams. A turning tool blade, tool wedge, and two cam blanks are furnished with the attachment.

Hisey Infinitely Variable Speed Buffing and Polishing Machine

The illustration shows an infinitely variable speed buffing and polishing machine now being marketed by The Hisey-Wolf Machine Company, Cincinnati, Ohio. The variable speed drive, which is designed on the V-belt principle, is said to be exceptionally quiet and smooth and so designed that it cushions the high peak loads which occur in buf-



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Titan Tool Co., Fairview, Pa.

STEVENS ROTARY TABLES STANDARD AND DIAL TYPES



Write for circular. Four sizes, two types of each.

Table graduated for single degree reading. Precision and accuracy. Thirty years' experi-ence designing circular attach-

ments.

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Fig. 705—
"Hallowell" Steel Tool Stand. With or without casters,

HALLOWELL

STEEL TOOL STANDS

-a mobile blessing for machine shops, these stands go right to the scene of the job. They keep tools safe and in order - eliminating the confusion of the old-fashioned traveling tool box. Time savers, money savers-"Hallowells" have a definite place in your shop.

TANDARD PRESSED STEEL CO. BRANCHES JENKINTOWN, PENNA.

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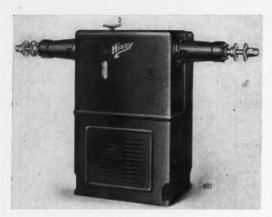
DETROIT INDIANAPOLIS

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Hisey Infinitely Variable Speed Buffing and Polishing

fing and polishing. Speeds from 1,700 to 3,500 r.p.m. are available through a hand wheel located at the top of the machine. A simple dial indicator (no squint, no squat, no stoop) constantly indicates the spindle speed, reading directly in revolutions per minute. Speed

can be changed while the spindle is in action, only 10 seconds being required to change speeds from extreme high to extreme low or vice versa. The proper speed is available for any polishing, buffing, or coloring operation with any size or type of wheel and worn wheels can be operated at an efficient speed.

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The straight front pedestal presents the wheels in advance of the machine column, affording ample freedom of operation and foot room. A patented lubrication system with visible oil supply automatically maintains the proper oil level for long periods. Ball bearings are used throughout, protected with combination labyrinth and contact seals. The spindle and bearing housing assembly can be removed as an integral unit without disturbing the bearings them-Wheel arbors have flat top threads and bronze safety wheel clamping nuts. The machine is made in 3, 5. and 71/2 h.p. capacities and can be furnished with any NEMA motor of any







selves.

electrical characteristics. It can also be supplied without motor if desired.

SealMaster Ball Bearing Cartridge Unit

Stephens-Adamson Mfg. Co., Aurora, Ill., has brought out a ball bearing cartridge unit, known as the "SealMaster" which consists of standard SealMaster bearings in a cartridge-type housing designed to be easily adaptable to any and all types of machinery in which anti-



Straight or Taper with Straight or Spiral Blades

ONE

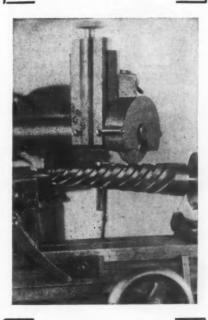
MACHINE SET-UP CPERATION



Cutaway View of SealMaster Ball Bearing Cartridge Unit Showing Self-Aligning and Patented Seal Construction

friction bearings are used. Like Seal-Master pillow blocks, flange and take-up units, SealMaster cartridge units are permanently sealed, prelubricated, and self-aligning. The SealMaster centrifugal labyrinth seal is said to effectively seal the bearing against all foreign materials while effectively retaining the lubricant. Wear or glazing of felts is avoided due to the fact that they are assembled without pressure. Misalignment of the shaft cannot interfere with the effectiveness of the seal, due to the fact that the outer race of the bearing is ground on a radius and locked in a ground housing socket with a locking nipple which permits from two to four degrees misalignment in any direction.

The unit is designed for shafts of from % to 21% in. in diameter, the outside diameter of the unit being from



You will get from three to five times as many pieces per grind, because you leave every particle of metal possible to support the cutting edge.

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MARKING
BY ROLLING
IS FAST AND
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PRESERVES
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PIECE PARTS.
REQUIRES
ONLY FRACTION OF
APPLIED
PRESSURE
AS COMPARED TO
STAMPING.

QUICK SET-UPS

MODEL 25 HI-DUTY MARKING MACHINE

This machine operates from your plant air line, and is one of numerous models built to produce fast, neat marking on metal parts. Hi-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked, showing lettering and location, also state required production.

GEO. T. SCHMIDT, Inc. 1806 BELLE PLAINE AVE. CHICAGO, ILL. 3% in. in the case of the %-in. diameter shaft to 6% in. for the $2\frac{18}{8}$ in. diameter shaft.

"Toledo" No. 101 and 102 Adjustable Bolt Die Stocks and Die Heads

The Toledo Pipe Threading Machine Company, Toledo, Ohlo, is now marketing two adjustable bolt die stocks which



Toledo No. 101 Adjustable Bolt Die Set Complete with Stock and Guides

are identical except for size. The No. 101 has capacity for $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{5}{6}$, and $\frac{5}{8}$ in. N.C. (U.S.S.) or N.F. (S.A.E.) dies and $\frac{9}{8}$, $\frac{7}{16}$ and $\frac{1}{2}$ in. pump rod die. The No. 102 has capacity for



Top and side views of Toledo No. 101 and No. 102 Adjustable Bolt Die Stock

½, Å, %, ¼, %, and 1 in. N.C. (U.S.S.) or N.F. (S.A.E.) dies. The feature of the tools is their easy, positive, univer-

GRINDING WHEEL DRESSERS

We make all types of Dressers and Cutters

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DESMOND-STEPHAN MFG. CO. URBANA, OHIO

The Canadian Desmond-Stephan Mfg. Co., Ltd. Hamilton, Ontario, Canada



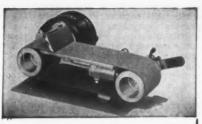
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24" HI-SPEED BAND SAW

Saws Nearly Everything Including Wood, Sheet Steel, Brass and Alumi-num Casting Gates, etc. 1½ H.P. Direct Motor Drive.

Also 30"-36"-42" Sizes.

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An Inexpensive ABRASIVE BAND GRINDER ...

"Built Like a Machine Tool"

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on the belt. Ball bearing throughout. Equipped with ALEMITE LUBRICATION complete with grease gun.

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HORMEL-M GRINDER

WALLS SALES CORP. 96 WARREN ST. NEW YORK, N. Y.



December, 1939

CHICAGO, ILL., U, S. A.

MODERN MACHINE SHOP

Overhead Motor Drive Attachment (Motor Extra).

sal die adjustment and smooth, easy cutting die segments which are said to provide everything that is desirable in a bolt die stock. Dies are simultaneously moved in or out for deep, shallow or standard threads simply by revolving the knurled sizing ring. Each die segment, even when the standard setting is changed, assumes a proportional share of the work, which makes for easier cutting, smoother threads, and longer die life. The dies are easily reground.

The stocks are small and compact.
The No. 101 measures 17 in, from tip

to tip of handles and weighs 2% lbs. The No. 102 measures 25½ in. and weighs 5¼ lbs. Both stocks are supplied in partitioned red enamel metal boxes.

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"Essco" Portable Tool Stand

A portable tool stand especially designed for machine shop use is now being marketed by Metal Products Di-



"Essco" Portable Tool Stand

vision, Electric Service Supplies Co., 17th and Cambria Sts., Philadelphia, Pa. The stand is 32 in. high, 24 in. wide, and 18 in. deep with drawers that are 17 in. wide, 15% in. long, and 5 in. deep inside. The stand is equipped with 2½-in. swivel-type castors. The drawer is



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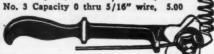


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The CLEVELAND WIRE SPRING Co. CLEVELAND . OHIO

Here's a Real Spring Winder!

No. 1 Capacity 0 thru 3/32" wire, \$1.25 No. 2 Capacity 0 thru 3/16" wire, 2.50



Will Earn Its Cost In One Day The HJORTH Perfection Spring Winder offers the ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

HJORTH LATHE & TOOL CO. 12 BEACON. STREET MASS.

equipped with a flat key lock and two keys.

The upright posts are 1½ x 1½ x ½ in. rolled angle members with shelves and drawers of No. 18 U. S. gauge steel with hemmed edges. Dome-type nuts, concealing the bolt threads, are supplied and all bolts and nuts are cadmium plated. The stand is finished in baked olive green enamel. The stand will be shipped either knocked down or assembled, as required.

Sangamo Amperehour Meter

To enable more efficient plating solution and production control, Lasalco, Inc., 2822 LaSalle St., St. Louis, Mo., has placed on the market an amperehour meter to be known as the "San-

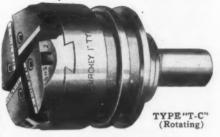


Sangamo Amperehour Meter

gamo." The amperehour meter registers the number of amperes that have been used in terms of amperehours. The Sangamo Amperehour Meter can be installed in the same manner as the ordinary ammeter and is said to require no highly technical trained men for operation.

The Sangamo Amperehour Meter can be furnished in three types: to indicate the amperehours required for any particular operation; with totalizing dials to totalize amperehours over a long period of time; or with a combination of these features to indicate individual plating operations, and to totalize long plating runs.

Murchey Presents



(Also in Non-Rotating Type T-G)

Tangent Chaser DIE HEADS

Designed to use tangential chasers, these rotating heads will cut extremely accurate threads on long production runs.

Collapsible MACHINE TAPS

Universal machine taps used as a stationary tap with handle or as a rotating tap by removing handle.

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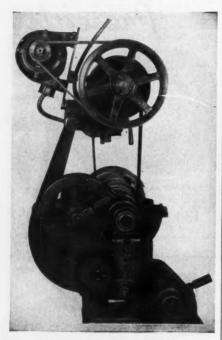
MURCHEY MACHINE & TOOL CO.

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Murchey Manufacture All Styles of Self-Opening Die Heads, Collapsible Taps, Bolt and Pipe Threading Machines, Pipe Cutting-off Machines, Double End Reaming, Chamfering and Drilling and Threading Machines.

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PRODUCTION EQUIPMENT CO.

5219 CHESTER AVE. CLEVELAND, OHIO

Amperehour meters of over 100 amperes capacity are supplied with external shunts. These shunts should be connected between the tank rheostat and the tank, if convenient, so that the possibility of error is minimized. Meters supplied with shunts are furnished with five foot shunt leads. Longer shunt leads are available, depending upon the the length of lead desired.

Jessop Silver-Clad Steel

The Composite Steel Division of Jessop Steel Co., 608 Green St., Washington, Pa., has perfected a method of welding stainless-clad steel that eliminates any danger of reduction in corro-

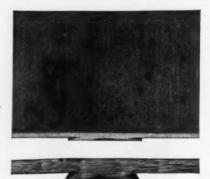


Fig. 1 (Top)—Top view showing cladding on piece of welded stainless-clad steel, which has been subjected to salt spray test. (Bottom) Cross sectional view of same piece.

sion resistance in the weld zone. In the past, some difficulty has been found in welding stainless-clad steel, due to the admixture of mild steel with stainless steel in the weld zone. This often occurred even when stainless rods were used throughout.

The new method of welding stainless-clad steel maintains the full corrosion resistance of the weld zone, even when a mild steel rod is used for welding the backing. Figure 1 is an unretouched photograph (top and cross sectional view) of a piece of welded Silver-Ply, a stainless-clad steel manufactured by the Jessop Steel Company, which test piece has been subjected to a 24-hour exposure of a 20 per cent salt spray mist at Pittsburgh Testing Laboratory. It will be noted from top view, that there is

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



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is 9 Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive — Last for

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New Nesting Type Tote Pans



Lots of 50 \$1.00 each

20" long x 12" wide x 61/2" deep. 16 ga., drag holes and handles both ends.

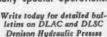
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SPECIAL MACHINERY PROBLEMS

HERE'S THE HYDRAULIC PRESS YOU'VE BEEN LOOKING FOR!

Now-for broaching, assembling, straightening-tested DEN-ISON features in a new series of standard-type, smallcapacity hydraulic presses. Compact, space-saving, selfcontained units. Pressure and directional controls, motor, pump, and starter are all assembled within the new rounded frame! Working capacities from 5 to 50 tons. 26-inch maximum stroke, with 29-inch maximum vertical opening. Both foot-pedal and hand-lever controls for ram. Extra toe-space for operator...controls placed for quicker, easier operation ... and numerous other features that give greater efficiency and accuracy. Easily modified for many special operations.





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M - D Facing Heads With Automatic Feed

Can be attached to Column Boring Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse, feeds automatically and covers faces 6" to 30".

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MUMMERT-DIXON CO. 120 PHILADELPHIA ST., HANOVER, PA. no more corrosion in the weld zone than in adjacent parts of the piece.

Figure 2 illustrates the procedure for welding stainless-clad steel by the new method. Figure 2A shows the plate as supplied, the lined portion representing the cladding. The plate is then scarfed and the cladding bent down with a follow-up tool or hammer, as illustrated in Figure 2B. The primary weld (bead No. 1-Figure 2C) is made with a 1/4-in. diameter stainless steel coated rod at the juncture of the two claddings. The two plates are then turned over and secondary welds made on underside of exposed cladding, as indicated in Figure 2D, using a 18-in. diameter stainless steel coated rod. The final weld (joining the mild steel backing) may be made with a 14-in. diameter mild steel

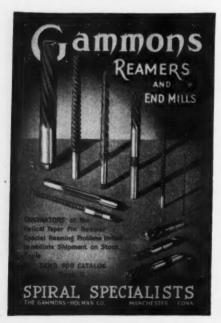




The more particular you are, the better you will like the careful construction and the attractive appearance of Gerstner Chests. Choose yours from our free catalog.

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DAYTON, OHIO



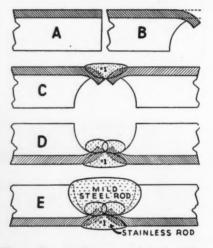


Fig. 2—Steps in the new method of welding stainless-clad steel.

coated rod. Figure 2E represents the completed weld; bead No. 1 is then ground flat with the cladding.

In all cases where stainless rods are used, the rod should be richer in alloy than the cladding; for example, on Type 304 Silver-Ply use 25-12 rod; on Type 316 Silver-Ply use Type 317 rod. Lowest possible amperage and fastest possible welding time are recommended.

The procedure outlined permits great savings in cost of rods, since mild steel may be used to weld the backing.

"Chicago" Mounted Wheel Chart

Designed for wall mounting, this 14% x 22%-in. cardboard chart presents, in color, the different types and kinds of mounted wheels marketed by Chicago

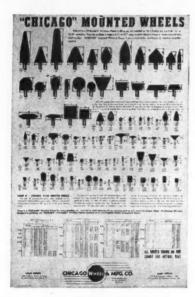


Chart of Types, Sizes, and Specifications for "Chicago" Mounted Wheels

Wheel & Manufacturing Co., 1101 W. Monroe St., Chicago, Illinois.

Specification tables make it possible for the user to determine at a glance the size of the mandrel used with each wheel size and give the manufacturer's code number for the particular size and type of wheel desired. Copy of this chart will be sent without charge to any user of grinding wheels.

Ahlberg Pillow Block Display

To help mill supply firms, hardware wholesalers and retailers sell two new series of small, low-cost pillow blocks, the Ahlberg Bearing Company, 3029 W. 47th St., Chicago, Ill., has devised the effective counter display shown in the

GRAND RAPIDS Combination Tap & Drill Grinder

MOTOR DRIVEN



Tap Grinding ---

Tests have proven that taps ground on a Grand Rapids will cut with less than half the power required for hand ground taps and will stay sharp for several times as long, even when hand grinding is done by the best mechanics.

Drill Grinding -

For grinding taper or straight shank drills, and drills with enlarged shank or sockets. You can grind small drills and then large drills, straight and then taper shank drills with one simple adjustment of the tailstock.

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COMPARE!

- * Rugged oversized flexible core. Tough, oil-resistant rubber outside casing.
- * Motor-end of shaft reinforced. Oilite bearing.
- * Hand-piece ball bearings, labyrinth oil seal. Removable clamp spindle.

Now, on general utility jobs, you can have satisfactory results in grinding, filing, wirebrushing, sanding, polishing, buffing and drilling without the investment in production-type machines—and at a big saving in operation and upkeep. For STOW now offers these Utility Flexible Shaft Machines—patterned closely after STOW Production Units—at popular low prices—and with proved STOW features giving reliability and long life.

The New Stow Juniors represent a new VALUE achievement, based on increased manufacturing volume, plus design standardization. They are the result of the 65 years experience with all kinds of Flexible Shaft applications by STOW engineers.

Write for full information and low prices TODAY! We will be glad to send you the name of your nearest dealer.

Also Manufacturers of Stow Heavy Duty Flexible Shaft Machines for High-Volume Production Operations.

STOW MANUFACTURING CO., INC. 1 Shear St., Binghamton, N. Y. Established 1875 Inventors of Flexible Shafts accompanying illustration. The display presents two types of pillow blocks, both of which have precision ball bear-



Ahlberg Pillow Block Display

ings. One, the standard, is mounted in an all-metal block. The other has the bearing mounted in a molded cushion of Neoprene (synthetic rubber) which insulates the bearing from the metal housing and results in exceptionally quiet anti-friction operation. Shaft sizes range from ½ to 1% inches.

"Tannoid" Treatment for Burns

The tannic acid treatment for burns, which is the treatment preferred by many physicians and hospitals, has been made available for use in first-aid work by the Davis Emergency Equipment Co., 55 Van Dam St., New York, N. Y.

The Davis preparation, which is known as "Tannoid," consists of a water-soluble jelly containing the proper proportion of tannic acid. When applied to a burn, it is said to relieve the pain, lessen the toxic effect, and reduce the formation of scar tissue. The preparation is merely spread on the burn from a collapsible tube and covered with a compress. Being water-soluble, it is easily and painlessly removable if further treatment is required.

Tannoid is non-freezing at temperatures as low as 20 deg. below zero, F., thus making it suitable for use on service trucks and in field work. It is sup-



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plied in 5-oz. and 1½-oz. tubes, and in unit cartons containing six ½-oz. tubes.

Landis Speed Calculator

The Landis Tool Company, Waynesboro, Pa., has made an exceedingly useful Speed Calculator available to those responsible for the operation of precision grinding equipment. One side of the calculator makes it a simple matter to quickly compute the revolutions of the grinding wheel per minute for six different surface speeds. Wheel



Unique construction enables operator to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep.

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Write for Bulletin No. 80 101-105 Lafayette St., N. Y.

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REQUEST BULLETIN 25

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diameters ranging from 1 to 42 in. are included.

The reverse side of the calculator makes it just as simple to compute the revolutions of the work per minute for four different surface speeds. Work diameters ranging from ½ to 10 in. are included. In addition, brief yet pertinent information regarding the theory of wheel and work speeds will be found on the calculator.

Anyone interested may obtain one of the calculators by requesting it on his company letterhead.

"Murco" Unit Heater

In the description of the "Murco" Unit Heater which was published in the Sep-



tember, 1939, issue of MODERN MA-CHINE SHOP, the wrong picture was



"Murco" Unit Heater

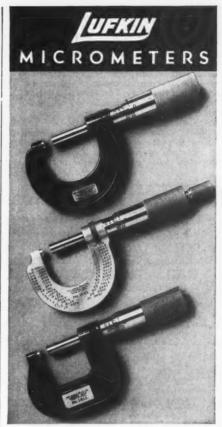
used. The correct illustration is reproduced here. The heater is a product of D. J. Murray Mfg. Co., Wausau, Wis.

Trade Literature

"Fourteen Reasons for Automatic Lubrication" is the title of Bulletin J, now being distributed by Bijur Lubricating Corp., Long Island City, N. Y., which explains in a concise manner fourteen reasons why automatic lubrication is applied to modern machines. Copy free upon request.

Westinghouse Combination Linestarter. Stressing low installation and operating costs, compactness, and safety of Westinghouse combination linestarters, combining the "De-ion" circuit breaker, is the purpose of a pamphlet released by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. The arc quencher, dividing and extinguishing the arc almost instantly, eliminates flashover, assuring safety for the operator, and the high overload capacity results in unlimited life of arc box and contacts. Banishing of arc hazard permits a snugly built, compact mechanism retaining ample wiring space and complete accessibility of all parts.

The pamphlet, number B.2131, may be obtained free upon request.



They are made from the finest materials especially selected for a long life of precision duty. The most careful workmanship goes into them. With their exclusive features it is most simple to take readings accurately and quickly. That's why we say they're the world's finest mikes.

Write for free catalog No. 7.



Diamond Wheels for Grinding Cemented Carbides. Two outstanding diamond wheels, the Norton Metal Bonded and Resaloy, for grinding cemented carbides are discussed in an attractively illustrated eight-page folder published by the Norton Company, Worcester, Mass. Advantages and development of the diamond wheel are described in detail. Copy free upon request.

New Departure Bulletin IV-7 describes an example of a modern application of precision ball bearings to a horizontal

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boring and milling machine headstock. The bulletin is regularly issued to holders of New Departure ring binders on industrial bearing applications, but is available to others on request. Address New Departure, Division General Motors Corp., Bristol, Connecticut.

Atlas Catalog No. 40 presenting complete information on Atlas machine tools and equipment for 1940 has been

released by Atlas
Press Company,
946 N. Pitcher St.,
Kalamazoo, Mich.
Several new attachments and accessories are announced, along
with the year's
design improvements in Atlas
lathes, drill presses, arbor presses,
and shapers. Copy



free upon request; address Dept. 7.

Allis-Chalmers Lo-Maintenance Motors. Bulletin No. 1195 entitled "Save on Service Costs with Allis-Chalmers 'Lo-Maintenance' Motors" has been released by the Allis-Chalmers Manufacturing Company, Milwaukee, Wis. The bulletin is devoted to the features of squirrel cage induction motors.

Several pages of this eight-page bulletin are devoted to case studies of "Lo-Maintenance" motors that have been in operation under adverse conditions. Also included are illustrated descriptions of construction details of the motors and a table giving the common types of squirrel cage motors and their applications. Copy free upon request.



shapes and cuts enable manufacturers to select the exact file for the job.

410 TRUMBULL STREET, ELIZABETH, N. J. Manufacturers of Mechanics Hand Tools and Knurls

Per Cent of Thread Chart. The R. G. Haskins Company, 619 S. California Ave., Chicago, Ill., has published a new chart showing tap drill sizes and percentages of threads. It is claimed to be more complete than the usual tap drill chart. Copy free upon request.

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Sterling Single-Phase Motors are illustrated and described in detail in Bulletin No. 150 now being issued by Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles, Cal. Copy free upon request.

Ex-Celi-O Precision Thread Grinders. A series of three bulletins on the line of precision thread grinders made by Ex-Cell-O Corporation, 1206 Oakman Blvd., Detroit, Mich., is now ready for distribution. Bulletin 14091 covers Styles No. 33 and 33L machines, and Bulletin 14191 features the Style No. 50 machine, both of these machines being used for accurate production grinding. Bulletin 14291 is devoted to the Style No. 39 internal machine for accurate internal grinding.

Copies free upon request.

G-E Synchronous Motors. This 52 - page booklet is a comprehensive presentation of the line of highspeed and lowspeed synchronous motors. special synchronous motors, and synchronous motorgenerators made by General Electric Company, Schenectady, N. Y. Sections of the booklet include one on the "Economies of the Synchronous Motor" and another on "Applications of Synchronous Motors in Various Industries." A direct-reading Power - Factor -Improvement Chart is given. The booklet is well illustrated. many of the photographs showing actual installations of the equipment discussed in the text.

Copy of publication GEA-1191-B free upon request.



Did You Know That-

Sheet metal can be lubricated as it is fed to the press by means of a simple and inexpensive lubricator? See page 82.

Cemented carbides are now available in the form of tubing, spiral, and round or shaped bars? See page 148.

The teeth on manicure files are made by "drifting" the metal? See page 46.

A jig grinder with which holes can be ground straight, angular, or tapered, within extremely fine limits, has been placed on the market? See page 164.

Rivets can be driven and headed at a rate of 3,200 per hour? See page 115.

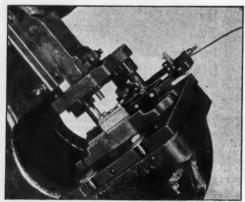
It takes two weeks to polish an ordinary sewing needle? See page 95.

As many as 300,000 parts can be threaded with one die? See third cover page.

Continuous automatic spot welding is now possible? See page 124.

Rotating masses in heavy machinery can be balanced without removing them from the machine? See page 114.

DICKERMAN HITCH FEED



Dickerman Hitch Feed mounted on a tilted press. Finished parts slide down into a receptacle in back of the press.

 Adaptable to any ordinary punch press without press alterations.

Built to feed from any position on any style die. Although the feed can be attached to the bolster plate of the press, it is usually affixed to the die-set as a permanent feeding mechanism for that particular die.

Quick set-up makes the Hitch Feed particularly economical for short runs.

Write for folder No. 84

H. E. DICKERMAN MFG. CO. SPRINGFIELD A

Landis Four-Spindle Semi-Automatic Threading Machine, a precision machine designed for the threading of automotive parts, bolts, studs, rods, and so on, on a high production basis, is described and illustrated in detail in Bulletin No. E-88-1 distributed by Landis Machine Company, Inc., Waynesboro, Pa. Copy free upon request.

Cone-Drive Engineering Manual. engineering manual covering technical data on Cone-Drive worm gearing has been made available to engineers inter-

ested in worm gearing by Cone Worm Gear Division, Michigan Tool Company. 7171 E. McNichols Rd., Detroit, Mich. The manual provides complete data on horsepower ratings, sizes, ratios, tooling available, and so on.

Complete charts are included for determining ratings in accordance with pressure, ratio, and velocity factors for various classes of service. Data and formulae are provided to enable the designing of units to exactly meet specific requirements. This information covers all such factors as center distance. number of gear teeth. pitch diameter, and base circle.

A typical Cone-Drive worm gearing layout with design formulae is included, as well as formulae for figuring journal loads, gear stresses, and so on. The manual also contains specifications of standard Cone-Drive speed reducers. Copy free to any mechanical executive upon request.

"Modern Maintenance Methods" is the title of an informative booklet which gives the answers to a wide variety of maintenance problems. The booklet is divided into three parts-Floor Maintenance, Sanding and Refinishing, and Sawing-each section containing special information on one of these subjects. Descriptions and photographs of mechanical equipment particularly suited to maintenance operations are included. Anyone interested in maintenance work may obtain a copy by addressing Porter-Cable Machine Company. Wolf St., Syracuse, New York.



FOR YOUR LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Shop Equipment

Atlas lathes, drill presses, 7-inch shaper, and arbor presses are illustrated and described in the new Atlas Shop Equipment for 1940 catalog No. 40. Atlas Press Co., 1146 N. Pitcher St., Kalamazoo, Michigan.

Air Filters for Spray Booths
 Bulletin No. 244, featuring American
 Air Filters for spray booths and fin ish drying, contains helpful infor mation for solving problems of prod uct finishing. American Air Filter
 Co., Inc., 127 Central Ave., Louis ville, Kentucky.

3. Flexible Shafts and Machines

N. A. Strand & Co., 5001 N. Wolcott Ave., Chicago, Ill., has issued Catalog No. 27 containing 72 pages of illustrations, descriptions, and specifications of Strand equipment.

4. Ball Bearings

New Departure Bulletin IV-7 describes an example of a modern application of precision ball bearings to a horizontal boring and milling machine headstock. New Departure, Div. General Motors Corp., Bristol, Connecticut.

5. Lathes

New Catalog 100 illustrating and describing the entire line of South Bend Lathes, Chucks, Tools and Attachments is just off the press. Contains 112 pages and 250 illustrations. South Bend Lathe Works, 370 E. Madison St., South Bend, Ind.

6. Arc Welder

The new Wilson "Hornet" Arc Welder is featured in a new bulletin published by Wilson Welder and Metals Co., Inc., 60 E. 42nd St., New York, N. Y.

7. Gears and Gear Units

Farrel-Birmingham Company. Inc., 381 Vulcan St., Buffalo, N. Y., has available Catalog No. 483 containing value information for all gear users.

8. Drill Presses

A new drill press book containing specifications and prices of complete line of Delta Drill Presses is offered by Delta Mfg. Co., 667 E. Vienna Ave., Milwaukee, Wisconsin.

9. Rotary Tables

Stevens Rotary Tables, standard and dial types, are illustrated and described in circular available from John B. Stevens, Inc., 306 Hudson St., New York, N. Y.

10. Stainless Steel Stock List

This is a handy 16-page Stocklist SS100 showing size of Rezistal sheets, bars and welding rods carried in Crucible's Mills and Branches. Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y.

11. Lathes

New bulletin No. 393, published by Rockford Machine Tool Co., Rockford, Ill., gives specifications and full descriptions of the Economy Lathe Line.

12. Collet Chucks

A new bulletin featuring Universal Collet Chucks has been released by Universal Engineering Co., Frankenmuth, Michigan.

13. Shim Application Chart

This new chart, just released, contains a comprehensive survey of proved applications for laminated shims and shim stock. Laminated Shim Company, Inc., 21-86 Fortyfourth Ave., Long Island City, New York, N. Y.

14. Vertical Turret Lathe

A new 24-page catalog has just been published by the Bullard Co., Bridgeport, Conn., which illustrates and describes the Bullard Spiral Drive Type Vertical Turret Lathe.

15. Motor Lubrication

A new three-color bulletin describing U. S. Lubriflush system of motor lubrication has just been issued by U. S. Electrical Motors Inc., Los Angeles, Cal.

- 16. Machining Zinc Alloy Die Castings The New Jersey Zinc Co., 160 Front St., New York, N. Y., has released a new booklet titled "Practice in Machining Zinc Alloy Die Castings."
- 17. Woodruff Type Keys and Cutters Catalog V-111, issued by The Whitney Chain and Mfg. Co., Hartford, Conn., completely details Whitney Woodruff Type Keys and Cutters.
- 18. Coated Abrasive Papers and Cloths A useful catalog and price list chuck full of useful information on coated abrasive papers and cloths has just been issued by Abrasive Products, Inc., South Braintree, Mass.
- 19. High Speed Grinders

Themac High Speed Portable Electric Precision Grinders are illustrated and described in a new circular released by The McGonegal Mfg. Co., East Rutherford, N. J.

20. Electric Etcher

Wm. Brewster Co., Inc., 40 Church St., New York, N. Y., has released a circular illustrating and describing the Etchograph for marking iron and steel tools, test pieces, hardened parts, etc.

21. Profile Grinder

The new Multi-Purpose Head Boyar-Schultz Heavy Duty Profile Grinder No. 2 is illustrated and detailed in a new bulletin just released by Boyar - Schultz Corporation, 2120 Walnut St., Chicago, Illinois.

22. Foot-Control Switches

A new folder has just been released by The Walton Co., 98 Allyn St., Hartford, Conn., which illustrates and describes Leeds Foot-Control Switches.

23. Spring Data Sheet

Helpful data sheet featuring stock springs in 234 sizes ranging in length from ¼" to 24"; in diameter from ½" to 4"; in wire size from .016 to .500. Hardware Products Co., 105 Richmond St., Boston, Mass.

24. Hydraulic Production Presses

Uses, specifications and engineering data for Farquhar Hydraulic Production Presses are included in a 24-page bulletin issued by A. B. Farquhar Co., Ltd., 404 Duke St., York, Pennsylvania.

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MASSACHUSETTS

La Salle La-Led 1045. In this eightpage folder, issued by the La Salle Steel Company, Chicago, Ill., the manufacturer describes the physical proper-ties, uses, and advantages of La-Led 1045—a general purpose shafting and hardening steel having a machinability up to 140 surface feet per minute. Copy free upon request.

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Excellent facilities for grinding gears, cams, threads and splines on a contract basis.

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HARTFORD SPECIAL MACHINERY COMPANY

Hartford, Conn.

Westinghouse Trolley Material Catalog. A 90-page catalog, "Trolley Line Material and Rail Bonds," is ready for distribution by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. The book is divided into six divisions: trolley line material for mines and industrial plants, trolley line material for street railways, trolley

coach line material, catenary trolley line material, rail bonds and wire tables. It is complete, liberally illustrated, and substantially bound.

Identified as catalog section number 74-100, the catalog will be sent free to plant managers, mechanical engineers, layout engineers, or machine shop executives upon request.

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"Doall Digest." A recent issue of this interesting publication issued by Continental Machines, Inc., 1306 S. Washington Ave., Minneapolis, Minn., features photographs and data on "Doall" Contour Machine installations in ten typical plants. Also included is a picture of the "Machines and Progress" chart distributed by this firm. Copies of the Doall Digest and the chart free.

Johnson Universal Bronze Chart. A handy wall chart made in the shape of a bronze bar is now being distributed by Johnson Bronze Company, 590 S. Mill St., New Castle, Pa. The chart gives pertinent information on Johnson Universal Bronze Bars and specifications are given for the 329 sizes of cored bars carried in stock. The inside diameter of each bar is broached or bored and machined to within 12 in. of the size stamped on the bar, a 1/64-in, cut remaining.
Copy of the chart free upon request.

"How to Select and Use Wrenches" is the title of a 28-page booklet now being distributed by J. H. Williams & Co., 260 Lafayette St., New York, N. Y. Discussed in turn are how to select open-end wrenches, how to select adjustable wrenches, and how to use wrenches. Illustrations showing the application of wrenches to nuts and bolts as well as illustrations of various types of Williams wrenches are contained in the booklet. Included also is a simplified wrench selection table giving the openings and numbers of six Williams patterns for popular sizes of U. S. and S. A. E. Standard Nuts, Hex Cap Screws, and American Standard Nuts, together with a table of Williams dropforged wrenches for American Standard Bolts, Nuts. and Cap Screws. free upon request.

H&G Insert Chaser Die Heads. A series of three illustrated circulars on the H&G Insert Chaser Die Heads manufactured by The Eastern Machine Screw Corporation, 38-58 Barclay St., New Haven, Conn., are now being distributed by this firm. Bulletin No. 10 illustrates briefly the different styles of heads available for different classes of work and describes the savings which have been made through the use of these heads. Bulletin No. 11 covers H&G Insert Chaser Die Heads for rotary die spindles, and Bulletin No. 12 deals with stationary die heads for turret lathes. hand screw machines, and other machines on which the die head does not rotate.

Copies free upon request.

Carboloy Engineering Bulletin. As a result of an engineering survey of several years' duration, Carboloy Com-pany, Inc., has issued an engineering bulletin giving detailed recommendations for proper Carboloy grade selection, suggested speeds and feeds, and a method for determining power requirements.

The bulletin groups the materials to be machined into three main classifica-tions: i. e., steel, ferrous castings, and non-ferrous and non-metallic materials. A full-page chart of recommendations is devoted to each of these classificawith specific recommendations tions given for a wide range of metals within each classification. For example, in the chart on steel, S.A.E. steels are listed in 10 classifications with specific recommendations for each. Recommendations cover the suggested grade of Carboloy to use, minimum and maximum speeds, a suggested safe starting speed, and a power constant to be used in determining horsepower requirements in each case. To use the chart, the proper column which specifies the feed and depth of cut called for on the particu-lar application is selected, and the column listing the metal being cut. The point at which these columns converge contains the desired information.

The bulletin contains certain features that should be of particular interest to the practical shopman. It avoids the common method of listing recommendations so broad that errors in selection are probable. For example, in the matter of Carboloy grade selection, a definite grade is specified in each case that has a wide margin of safety, one that can be used with good results under average conditions. The bulletin also is specific in regard to proper speeds to use. In each case a definite, safe starting speed is listed and accompanying this specific recommendation is the suggested minimum and maximum speeds to which adjustments can be made after starting the job.

Copies of Bulletin GT-114 may be obtained from Carboloy Company, Inc., 1143 E. 8 Mile Rd., Detroit, Mich. A companion bulletin (GT-115) listing the physical characteristics and general use of all Carboloy grades is also available.



Abrasive Machine Tool Co	Crucible Steel Co. of America
Alco Tool Co., The	Cashinan Chack Company
American Swiss File & Tool Co188 American Tool Works Co., The53 Anderson Bros. Mfg. Co154	Danly Machine Specialties, Inc
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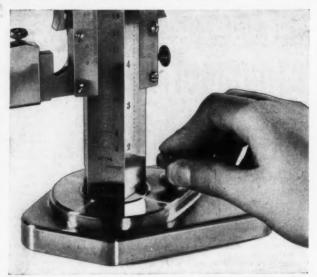
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